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RESEARCH REPORT ON A

REVIEW OF PHYSICAL SERVICES

FOR THE
HAMILTON-WENTWORTH
REVIEW COMMISSION

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Research Report on

Review of Physical Services

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REVIEW OF PHYSICAL SERVICES - PHASE I

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REVIEW OF PHYSICAL SERVICES - PHASE I

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SUMMARY

The review of physical services included water supply and treatment, sewerage and sewage treatment, solid waste management, storm water management, air quality control and noise abatement. Interviews were conducted with officials of the Regional Municipality, the Area Municipalities, the Conservation Authorities, and several groups within the Ontario Ministry of the Environment. These interviews were used to determine the nature and scope of services provided by each and their general reactions to the actual operation of the present form of government including changes that have taken place over the past four years. Following the interviews, questionnaires relating to specific details of servicing, administration and financing were sent to all municipalities. The various pieces of legislation that apply to the provision of services in the Region were also reviewed to help establish jurisdictional responsibilities.

1. Description of Services

Water Supply and Treatment

Under the Regional Act, the responsibility for water supply and treatment lies entirely with the Regional Municipality. Because the City of Hamilton had prior to 1974 already established water supply points for Dundas, Stoney Creek, Saltfleet and part of Ancaster, the initiation of a Regional water supply system was not a major problem. The upper tier simply assumed all of the local systems including all supply and treatment, pumping, storage and distribution mains. Thus in all urban development water is delivered to all customers (376,000) by the Regional system with the exception of two external supplies from

the Halton and Niagara Regions to small areas in Flamborough (Waterdown) and Stoney Creek. Figure 1 indicates the areas serviced including those areas added since January 1974. Water supply for all of Hamilton, Dundas and Stoney Creek and parts of Ancaster and Glanbrook is produced in the main treatment plant on Woodward Avenue in Hamilton. The wells in Ancaster will probably be used to service part of Dundas after Ancaster is connected to the "Hamilton" System. The rural portions of the Region are supplied from private wells, except for isolated communities such as Carlisle, Greensville and Willdan subdivision in Flamborough Township. The Waterdown area is supplied by wells in addition to the previously noted Halton supply.

Sewerage and Sewage Treatment

Under the Regional Act, the Regional Municipality also assumed the sole responsibility for collection and disposal of all sewage. At present, 363,000 persons are served by the Regional systems as shown on Figure 2. Sewage treatment is provided in three plants; Hamilton, Dundas and Waterdown. Major expansion of the Hamilton plant commenced just prior to the formation of Regional Government. Because of a contractual dispute these works, which were financed by the Province, have not been fully assumed by the Regional Municipality although the Region operates the complete facility. The Dundas plant is currently undergoing expansion and improvement to correct an outstanding inadequacy and permit further expansion of the Town. The Waterdown plant is also being expanded at present to its maximum potential flow. A major sewerage program was undertaken in Ancaster by the Ministry of the Environment just prior to formation of the Region, and this is now operated by the Region although it is still owned by the Province. A large portion of the sewer system in the City of Hamilton is of the combined type, i.e. carrying surface storm drainage as well as sanitary sewage. For this reason, the responsibility for drainage on local as well as Regional roads in the City of Hamilton has been assumed by the Regional Municipality, although this was not a requirement of the Regional Act. Separation of the combined system will eventually be implemented with redevelopment and road reconstruction.

Solid Waste Management

The responsibility for solid waste management is split, with the Area Municipalities being responsible for collection and the Regional Municipality responsible for disposal. The collection function is properly assigned at the local level because of the high interface with the residents and appears to be quite satisfactory. Prior to 1974, each area municipality had provided its own disposal area and these, for the most part, were unacceptable in terms of the standards set by the Ministry of the Environment. Currently, three major disposal facilities and four smaller temporary ones are operated by the Regional Engineering Department, as shown on Figure 3, including the Upper Ottawa Street landfill in Hamilton, the Ancaster landfill at Jerseyville and the solid waste reduction unit (SWARU) in Hamilton. The Upper Ottawa Street landfill is currently being overfilled and the Ancaster site will be filled within two years. The SWARU has not yet been able to operate at its rated capacity nor on a continuous basis.

The Regional Municipality is negotiating a contract with a private company for assumption of the disposal function. The proposed arrangement will include the provision of three transfer stations, the establishment of a new environmentally designed landfill in Glanbrook Township and the improvement of the operation of SWARU. The proposed overall contract cost of $12.00 per ton will be higher than the present disposal costs but these cannot be compared because of the inadequacies in the existing facilities.

The major problem facing the Hamilton Wentworth Region is one associated with the development of a new, large, adequately operated landfill site. The resistance of affected residents together with the extended process required to satisfy Provincial legislation, create an unreasonably long and expensive obstacle for the Region to overcome in order to correct the present unsatisfactory disposal arrangement. Provincial action to alleviate this problem would no doubt be welcomed by the Regional Government officials.

Storm Water Management

Responsibility for storm water management is divided under the Regional Act. The Regional Municipality is responsible for drainage on Regional roads and surrounding tributary lands while Area Municipalities continue to operate and maintain all remaining drainage systems within their boundaries; however, the Regional Corporation is empowered to assume through by-law all or any portion of the land drainage systems of the Area Municipalities. In addition, the four area Conservation Authorities are given responsibility for development regulation within the significant water courses in the Region and approval of urban discharges directly to the streams where the environmental setting may be impaired.

As previously noted, the Regional Municipality has assumed the storm water management responsibility in the City of Hamilton because of the dual function of the combined sewers. At present, there does not appear to be a common approach to the design of storm drainage facilities; each Area Muncipality and the Region establish design criteria for the areas within their jurisdiction and establish drainage requirements with subdividers for new developments. Where overlaps occur in drainage responsibilities, primarily in lands tributary to Regional roads, the Regional Municipality assumes the lead role and obtains agreements for the excess flow capacity and appropriate cost.

Air Quality Control

Air quality control is the responsibility of the Province. Under the Environmental Protection Act 1971, the Province through the Ministry of the Environment has the capability of establishing standards, monitoring air quality, carrying out an approvals and abatement program and conducting supporting research. The Ministry has established an extensive monitoring system in the Hamilton areas part of which is shown on Figure 4. The enforcement of air pollution control is generally applied through the West-Central Region office of the Ministry. There appears to be little contact between the Ministry and the

Regional and Local Municipalities in relation to air quality control. The general municipal attitude seems to welcome the Provincial involvement in this area. Certainly, the air quality has continued to improve over the past six or seven years as a result of the program to control industrial emissions in the Hamilton area. The most significant air pollution source now appears to be derived from city related activities, and its solution would involve the municipalities in a significant street-cleaning program.

At present there is no mandatory requirement for the municipalities to include air quality as a parameter in determining optimum land use. This can be a potential source of conflict if non-compatable air quality requirements are permitted to exist in near proximity. The Province now has air quality planning techniques which would be beneficial to the municipalities in their planning function.

Noise Abatement

Noise abatement is the responsibility of the local governments. Most of the existing municipal noise by-laws are based on Section 354 of the Municipal Act and are limited in scope. The Ministry of the Environment has drawn up a model noise by-law under the Environmental Protection Act and this has been made available to all municipalities in Ontario. This model by-law is much more comprehensive and includes acceptable noise levels for various types of development. The City of Hamilton has taken steps to adopt this model by-law for its own purpose and has appointed a noise control officer.

Noise abatement provisions are not now incorporated in the municipal planning processes. The Province's guidelines for "Acoustics Technology in Land Use Planning" could be used as a beneficial reference for reducing potential noise conflicts.

Certain noise related problems are beyond the jurisdiction of the municipalities. Vehicle, railway and aircraft noise are regulated by Federal law.

2. Decision-Making and Accountability

Decisions related to water and sewage services are implemented by the Regional Council and as such the Regional Councillors are accountable to the Community as a whole. Local representatives on Regional Council are therefore accountable to their local communities and individuals who reside there. The Regional Municipality is granted all the powers formerly held by local municipalities with respect to water and sewage except the power to establish a Public Utilities Commission. Policies for the provision of water and sewage services are developed by Regional Council in the form of by-laws and resolutions. Individual citizens can make representation to the Committee of Engineering Services with respect to the development of new policies. This is a political body consisting of a chairman and nine Regional Councillors which meets twice a month to examine policy proposals relative to physical services, listen to representations from public delegations and make recommendations to Council. It is not a decision-making body.

Like other physical services, the expansion of the water and sewage systems are generally a reflection of the needs created by the new developments in the community. Although the Engineering Department controls the provision of services, the Planning and Development Department has a major input in determining the scheduling and direction of the service. Some of the service requirements, for example the degree of sewage treatment, are set out by the Province and must be complied with by the Regional Municipality.

As already discussed, the solid waste management and storm water management functions are divided between the Regional and Area Municipalities. Accordingly, the decision making process and accountability are therefore divided in the same fashion. As the collection of refuse and land drainage (flooding) can very intimately affect individuals in the community it appears logical that these functions remain as prime responsibilities of the Area Municipalities. Conversely, the disposal of solid waste is more amenable to a Regional responsibility

in view of the disposal constraints placed on some of the local municipalities. Indeed, some would argue that solid waste disposal is a multi-Region or Provincial responsibility.

Again, as for sewage treatment, the selection and design of solid waste disposal facilities is closely monitored and controlled by the Province.

Decisions respecting air quality control are made by the Province. Regulations and guidelines are established and enforced by the Minister of the Environment. The municipalities and citizens have access to this process through their elected Provincial representatives or through the Ministry's Regional office in Stoney Creek.

Noise abatement is the responsibility of the Area Municipalities and therefore the elected representatives and their staff are responsible to the local citizens for implementations of policies. Certain noise sources such as motor vehicles, railways and aircraft are controlled only by the federal government and are therefore beyond the jurisdiction of the municipal governments.

3. Impact of Special Purpose Bodies

The four Conservation Authorities in the Regional Municipality have been created to oversee the management of water courses in specific watersheds. As such, they exercise certain powers in relation to drainage which touches, and sometimes overlaps the functions of the Regional and Local Governments. The scope of Authority activities includes flood control and low flow augmentation which affect the drainage policies and sewage treatment programs of the Region. Co-operation is said to be good between the Authorities and the municipal governments, although there appears to be instances where the flood-plain development objectives do not always coincide.

The Niagara Escarpment Commission has an approvals function with respect to developments within its Planning Area. Therefore permission to construct services within this area must be obtained prior to initiation of the works.

The Royal Botanical Gardens exercises authority over large tracts of land adjacent to Cootes Paradise Bay and Hamilton Harbour. Water quality objectives in these receiving bodies must be compatable with the uses of the adjacent lands.

The Hamilton Harbour Commission Controls considerable land areas adjacent to Hamilton Harbour. As a creature of the Federal Government, the Harbour Commission must conform with Federal and Provincial Legislation.

4. Impact of the Province

The Province exercises considerable authority over the activities of local government in relation to services:

i) The Environmental Protection Act has been promulgated:

For the protection and conservation of the natural environment.

To control discharge of contaminants (including air, water, vibrations, noise) which may impair the quality of the natural environment, cause damage to plant or animal life, or impair the health or safety of persons.

This affects the provision of water works, sewage works, solid waste disposal facilities, drainage works and air and noise discharges. All works must be approved by the Pollution Control Division of the Ministry of the Environment. In the near future all significant municipal works will also require to undergo an environmental impact assessment unless excluded specifically by the Minister under the Environmental Assessment Act.

ii) The Industrial Safety Act and Labour Relations Act relate to the construction and operation of services and provide for the safety and welfare of workers. All plans and speci-

fications for pumping stations, treatment plants, transfer stations, incinerators etc. must be submitted for review by the Department of Labour.

iii) The Public Health Act empowers the Province through the Ministry of Health to make investigations and inquiries into the cause for disease and advise as to public health generally. The designated Medical Officer of Health can test the public water supply or public bathing areas and take such action as required to protect the public if these waters are contaminated.

iv) The Ontario Water Resources Act regulates the construction, installation, alteration, or extension of water and sewage works. Proposed municipal works must receive certificates of approval from the Ministry of the Environment. The Act also establishes water quality standards for potable water. The Ministry also is empowered to construct water and sewage works under this Act. Also, certain subsidies for municipal construction are available under this Act.

5. Changes in Responsibility and Cost Since Regional Government

The changes in responsibility may be summarized as follows:

Water Supply and Treatment: Assumed in total by Regional Government.

Sewerage and Sewage Treatment: Assumed in total by Regional Government.

Solid Waste Management: Disposal function assumed by Region; collection remained with local municipality.

Storm Water Management: Drainage associated with regional roads assumed by Region; Area municipality retains responsibility for remaining drainage systems including local roads.

Air Quality Control: Provincial responsibility before and after January 1, 1974.

Noise Abatement: Municipal responsibility before and after Regional Government.

With the assumption of the various works associated with the foregoing, the Region assumed a total capital debt of $69,785,039, of which 93 per cent was attributable to the City of Hamilton.

The Region also assumed most of the personnel affected by the foregoing changes. So far as can be determined, slightly more than 400 municipal works employees were transferred to Regional staff at January 1, 1974. At present the Regional staff numbers 429. Comparison of total "works department" figures before and after 1974 indicates only a moderate increase in total staff related to provision of physical services.

It has been particularly difficult to make a comparison of costs for pre- and post-Region conditions. First it has been difficult to actually assign costs to specific services since the methods of assessment did not necessitate discrete cost separation. Also, the methods of assigning costs cannot be clearly defined without considerable effort; there is evidence that some works budgets may have reflected only direct costs and ignored the overhead associated with such things as legal costs, office rentals, general vehicle use and possibly even financing charges.

The Region now uses a rigorous control system to assign all costs to the appropriate department or section. Therefore direct comparisons of pre- and post-1974 costs would indicate the Regional ones to be somewhat higher.

Consequently, it has been concluded that a rigorous financial analysis cannot be carried out based upon the data currently available. It is suggested that this be appended to the report at a later date when the results of the financial analysis consultants are available.

Financial assistance is available for public works from several agencies as follows:

C.M.H.C.

For trunk water mains and sewers and for treatment works, loans of up to two-thirds of the eligible cost are available. The C.M.H.C. may forgive up to 25 per cent of the principal and interest at the date of completion.

For the preparation of a Regional Servicing plan, C.M.H.C. may fund up to 50 per cent of the cost of preparation.

Ministry of the Environment

The Ministry will provide up to 15 per cent of the cost of Regional water supply or sewage disposal facilities. This assistance only became available after Regional Government was formed.

Grants of 50 per cent of the cost of Regional solid waste studies are also available from the Province.

Ministry of Natural Resources

Conservation Authorities are eligible to receive grants from the Province for engineering feasibility studies for water control structures and construction and maintenance of channel improvements, erosion control and related works (55 per cent). In some instances, supplementary grants may be available.

Sales Taxes

Certain exemptions from Provincial and Federal Sales Taxes are available to municipalities for materials and equipment incorporated in capital works projects.

Water and Sewage Rates; Local Taxes

Water and sewage services are now funded by utility rates. Prior to regionalization there were a variety of funding arrangements. Uniform rates have now been put into effect throughout the Region. Sewage charges are collected by a 100 per cent surcharge on water bills. Most water is sold by meter with the exception of parts of Hamilton and the "Old" Town of Stoney Creek and these are based on assessment, but designed to be equivalent to the metered rates.

In existing developments new construction is paid for through local improvement charges. In new developments, oversizing charges and lot levies are used to fund trunk sewers, oversizing, pumping and treatment facilities.

Funds for solid waste disposal are generated from the Area Municipalities through taxation based on the system of equalized assessment. Funds are also received from private haulers for the disposal of non-municipal wastes.

The cost of storm drainage in the Area Municipalities is derived from general taxes. The Regional costs for storm drainage on City of Hamilton streets is levied directly against the City.

A comparison of 1973 and 1977 residential and commercial water rates for a theoretical annual consumption has shown that, with the exception of Stoney Creek, rates for metered residential usage have declined in each Area Municipality; commercial rates have gone down in Ancaster and Dundas and have risen in other municipalities.

A study of 1973 and 1977 sewage rates based on an assumed uniform yearly use has shown that some rates have increased (Hamilton, Dundas, "Old" Stoney Creek) while others have decreased (Ancaster, Flamborough, Saltfleet). The cost of sewage treatment has accelerated faster than water works over the past 10 years due to the demand of the Province for improved effluent quality and attendant chemical costs.

Rates for solid waste disposal were not levied separately before Regional Government but were contained in the general levy. This practice is still used by the Region, however rates are now uniform and are applied to equalized assessment. The present gross cost of solid waste disposal is $10.00 per capita. With the new disposal scheme proposed, this cost is expected to rise over the next few years to $19.30 per capita.

A study of solid waste collection costs indicates little change since the Region was formed other than normal escalation. However it can be noted that these costs will likely decrease somewhat after the new disposal scheme is initiated because of the greater convenience of the proposed waste transfer stations.

Storm drainage costs have also been included as part of the general tax rate and therefore a true comparison of pre- and post-Region costs has not been possible.

6. Conclusions and Recommendations

(a) The interviews with the municipal and other agency staffs generally reflected an acceptance of the present division of responsibility for physical services in Hamilton-Wentworth. Some felt that there has been a loss of personal contact between the individual resident and those responsible for providing the services as well as a reluctance by citizens to deal with the senior levels of government. Although there was little concrete evidence that this is a major problem, the comment kept recurring.

Consideration should be given, therefore, to some method of improved communication for the local citizen in terms of lodging complaints, making applications, etc.

(b) The process of making service applications to two municipal bodies plus special purpose groups was considered to be cumbersome and confusing to the public.

Consideration should be given to the simplification of this process so that a single application could suffice.

(c) The lengthy, and expensive process required to implement new, solid waste disposal facilities seems to be an unnecessary obstacle to the Regional Municipality and should be alleviated in some fashion.

Consideration should be given to requesting the Provincial Government to remove some of these obstacles or to take over the responsibility of designating suitable disposal areas so that this vitally necessary function can proceed without undue hinderance.

(d) The land drainage function is now fractured in several directions. Each Municipality has its own approach to this problem and as a result there are several different solutions. Moreover, the existance of four different Conservation Authorities within the Region adds to the variation of approach.

Consideration should be given to the establishment of a uniform storm water management policy for the Region. This could be established through the consultation of all Municipalities, the Conservation Authorities and Provincial representatives. Uniform policies for the Region will ensure that all areas are provided with similar protection from storm water runoff.

(e) Potential problems of air quality and noise could be avoided if available techniques were incorporated in planning procedures related to zoning by-laws, official plans and subdivision agreements. These methods can be implemented with the assistance of the Provincial agencies that employ experts in these fields.

Consideration should be given to incorporating this requirement in the Regional and local planning processes.

SECTION 1

INTRODUCTION

Purpose and Scope

This study has been carried out on behalf of the Hamilton-Wentworth Review Commission to assist its deliberations in relation to the adequacy of physical servicing within the Regional Municipality. In this study, physical servicing has included the following components:

- water supply and treatment
- sewerage and sewage treatment
- solid waste management
- storm water management
- air quality control
- noise abatement

The investigations included a review of the extent of servicing, the areas of jurisdiction and responsibility, the costs and quality of service. Particular emphasis has been placed on determining the changes that have occurred between the period just prior to formation of Regional Government up to the present. As part of a review of all servicing functions of the Regional Government, this study of physical services complements the other studies that have been conducted.

An attempt has been made to identify issues of concern or constraint that might have a detrimental effect on the efficiency of government in the area.

Methodology

The method of investigation has included the following activities:

- Review of existing legislation pertinent to physical services.
- Interviews with officials of the Regional and Area Municipalities and with officials from the Provincial Ministries and special purpose bodies having involvement in servicing in the Regional area.
- Follow-up questionnaire to the municipalities to obtain details related to scope of servicing, financial and rate details and organization and personnel data.
- Review of all data including reports, legislation, statistics and other material.

The data obtained have been organized under each of the servicing types in the following sections of this report and these sections have been subdivided generally as follows:

Introduction
Legislation
General Description
Responsibility for Policy and Financing
Financing
- Summary

The material presented herein represents Phase 1 of a two-phase review of physical servicing. This phase provides a basic inventory of services together with some pertinent observations and conclusions relative to their adequacy. A Phase II report will present an analysis of various alternative directions for local government in relation to their impact on physical servicing.

GENERAL CONSIDERATIONS

SECTION 2

1. Introduction

The following sections deal with the details of specific services:

Section 3. Water Supply and Treatment

Section 4. Sewerage and Sewage Treatment

Section 5. Solid Waste Management

Section 6. Storm Water Management

Section 7. Air Quality Control

Section 8. Noise Abatement

Since many aspects of the physical services are either common or are so inter-related as to be difficult to separate, this section has been included to deal with these elements rather than repeating them for each of the physical services. They include:

(2) Works and Responsibilities Assumed

(3) Organization of Works Departments

(4) Financing of Physical Services

(5) Rates for Physical Services

(6) Capital and Operating Expenditures

(7) General Impressions

In reviewing the data collected from the Regional and Area Municipalities, it was apparent that developing a base for comparison would be a problem. This was particularly evident in the case of costs. First, it is very difficult in some instances to actually assign costs to specific services since the methods of assessment did not necessitate discrete cost separation. Furthermore, the methods of assigning costs cannot be clearly defined without considerable effort; there is evidence that some works budgets may have reflected only direct costs and ignored the overhead associated with such things as legal costs, office rentals, general vehicle usage, and possibly even financing charges. In practice, these costs are frequently included with overhead costs for "soft" services and general administration.

It should be noted that the Region now utilizes a rigorous control system to assign all costs to the appropriate department or section. Therefore, even if direct costs had not risen at all, the comparison of pre-and post-1974 costs would indicate the Regional ones to be somewhat higher.

As will be noted later, financial data are sufficiently lacking at the time of this writing as to make meaningful analysis impossible.

Considerable data were collected through interviews and questionnaires directed to both Regional and Area Municipalities. These data were used to supplement the details of works assumed, the pre-1974 rates for services and certain financial data contained in two key documents:

- "Report on the Initial Assumption, Operation and Financing of Regional Roads, Sewage, Drainage and Solid Waste

Disposal Works", January 1974, prepared by Regional staff (referred to as The Assumption Report)

- "Report on Uniform Policies Related to Water and Sewage Facilities and the Establishment of Rates and Charges for These Facilities", prepared by Proctor and Redfern Limited. Volume I - Water, October 1974. Volume II - Sewage, January 1975. (referred to as The Rate Study)

It was agreed at the outset of this review that financial comparison should be made for the years 1972 and 1976. This may be feasible for financial analysis but is not viable for comparison of rates. Rate information for 1973/1974 has generally been used unless the historical data show the figures to be unbalanced. This is felt to be more meaningful and is compatible with the reports noted above which are the basic source of information.

2. Works and Responsibilities Assumed

The works assumed by the Regional Corporation in January of 1974 consisted of:

- Roads under the jurisdiction of the County of Wentworth and the Hamilton-Wentworth Suburban Roads Commission.

- Municipally-owned facilities in the Area Municipalities related to:

  (i) water works
  (ii) sewage works
  (iii) solid waste disposal

- Storm sewers in the City of Hamilton. All other Area Municipalities retained responsibility for the operation and maintenance of drainage works except on Regional roads.

- The City of Hamilton laboratory.

- Capital works-in-progress related to the above. These included major works as follows:

  (i) Ancaster sewerage system
  (ii) Waterdown elevated water tank
  (iii) Dundas sewage treatment plant expansion

- Subdivision agreements, only as they pertain to water and sanitary sewage (and storm drainage in the City of Hamilton).

- Equipment and selected personnel assigned to the planning, design, construction, operation and maintenance of the above works:

The Region also assumed the debts associated with these works which had previously been borne by the Area Municipalities (source-Assumption Report). See Table 1.

Of the total debt, $65,288,918 or 93 percent was attributed to the City of Hamilton (annual payment $7,590,665).

3. Organization of Works Department

(a) The Regional Department of Engineering

The works assumed by the Region are the direct responsibility of the Commissioner of Engineering and his Department of Engineering. The Committee of Engineering Services, a political body consisting of a Chairman and nine Regional Councillors, meets twice per month to examine policy proposals relative to physical services, listen to representations from public delegations and make recommendations to Council. The Committee is not a decision-making body; it reviews and makes recommendations

TABLE 1

DEBTS ASSUMED BY THE REGION ON JANUARY 1, 1974

(i)	Waterworks	
	- total	$28,257,069
	- 1974 payment	3,437,328
(ii)	Sanitary Sewage Works	
	- total	32,891,363
	- 1974 payment	3,739,894
(iii)	Solid Waste Disposal	
	- total	7,975,493
	- 1974 payment	911,917
(iv)	Storm Sewers	
	- total	661,114
	- 1974 payment	80,242
TOTALS	- Capital	$69,785,039
	- 1974 Payment	8,619,381

only. Public delegations may appear before the Committee but not before Council.

The Department of Engineering is made up of six Sections which are in turn subdivided to deal with specific aspects of engineering and operations as follows (number of employees is indicated in parenthesis):

Section	Subdivision
(i) Environmental Services (339)	-Environmental Planning (4) -Environmental Operations (133) -Distribution System Maintenance (Sewer and Water (138) -Technical Services (63) Director (1)
(ii) Transportation Engineering (not part of this review)	
(iii) Regional Laboratories (16)	-Waterworks (4) -Sewage Plant (4) -Materials Testing (1) -Special Projects (2) -Industrial Waste Control (1) -Supervision Personnel and Chemists (4)

(iv) Engineering Services (43) -Water and Sewage Works Design (20)
-Construction Supervision (19)
-Administration (4)

(v) Surveys (17)

(vi) Administrative Services (14 including Commissioner)

(i) Environmental Services

This section is responsible for the planning, operation and maintenance of the water, sewerage and solid waste management systems.

The Environmental Planning division is closely affiliated with the Planning and Development Committee as well as the Engineering Services Committee. Main duties consist of: preparing Current and Capital Budgets for physical services; preparing reports for the Engineering Services Committee relative to project approval, services to be constructed under the Local Improvement Act, and subdivision agreements; reviewing rezoning, official plan amendments, severances, site plans, draft plans and Niagara Escarpment Commission permits, all relative to physical services; investigating complaints about services and recommending action; preparing subdivision agreements, execution and registration; reviewing road construction programmes, closings and land sales; preparing policy relative to lot levies, cost sharing, cost recovery, etc. for subdivisions.

Preparation of master plans and the monitoring of parameters and assumptions made relative to those plans also falls

within the scope of the Planning division. This function integrates land use planning, subdivision development and scheduling of capital works to ensure funds are used to the upmost efficiency to meet current and projected demands for servicing.

Environmental Operations deal with the day-to-day operation of water and sewage plants, pumping stations and storage facilities. Works under its control consist of: the water-works purification plant, 21 water pumping stations, 17 reservoirs, four well fields containing 20 separate wells, three sewage treatment plants, and 21 sewage pumping stations.

The water mains and sewers are operated and maintained by the Distribution System Maintenance division. These currently consist of: 822 miles of watermains with valves and hydrants, 26,000 water meters, 672 miles of sanitary and combined sewers, and 191 miles of Hamilton storm sewers.

The Technical Services division is responsible for quality control of materials and methods used in the construction of Regional works and provides such services as: materials testing, TV camera inspection of sewers, material and equipment supply contracts, co-ordination of soils and hydro-geological studies, and special studies and training programmes. Services of this division are also "sold" to the City of Hamilton.

Disposal of solid waste also falls under the control of Technical Services. Facilities operated consist of the SWARU (solid waste reduction unit) in Hamilton, two major sanitary landfill sites and four minor landfill sites.

(ii) Transportation Services

Not within the scope of this review.

(iii) Regional Laboratories

The Regional Laboratories section provides analytical and testing service for the Region (as well as outside contracts) relative to: the water quality at the treatment plant and throughout the distribution system, routine control of sewage treatment plant processes, evaluation of construction materials, special plant studies, and industrial waste control.

(iv) Engineering Services

This section performs the detailed design and construction supervision of: roads, the water distribution network, sewage collection system, and treatment facilities. The section also provides private drain inspection, designs and supervises construction of facilities for other Regional departments, co-ordinates services on Regional roads, and approves plans and specifications submitted by developers and consultants.

(v) Surveys

The Surveys section not only deals with the layout of engineering works, but also performs property searches, surveys and registration of lands, and maintains a computerized inventory of all Regional properties.

(vi) Administative Services

The provision of routine administrative services such as typing, accounting, filing as well as issuance of contract documents, permits, etc. for various Departments falls within the scope of this section.

(b) Area Municipalities, Engineering-Works Departments

The organization of the department(s) responsible for supplying physical services before 1974, and the services remaining at the Area level after 1974, are described below. The personnel transferred to the Region are also noted; the criteria for transfer was that the employee be engaged at least 50% of the time in the provision of the specific service.

It should be noted that a simple before and after comparison of works personnel is difficult because of the interrelationship of physical services as defined for this review, and other public works. For instance, in some cases it is virtually impossible to separate storm drainage and roadway maintenance since the former is an integral part of the roadway system. It is also recognized that engineering personnel may be involved in the design of storm sewers, roads, parks facilities, etc., but cannot be assigned to any single one of these services. This has made it difficult for municipalities to respond to questionnaires and, undoubtedly, has led to some inaccuracies in the tabulations following:

(i) Town of Ancaster

Before Prior to 1974, the Town provided water services through a Public Utilities Commission. Four P.U.C. employees (two administrative, two operational) were transferred to the Region. Since the sewer system was not constructed at that time, there was no staff associated with that service. In 1973, 20 employees were engaged in the provision of physical services. Since the only service assumed by the Region was solid waste disposal, only one employee was transferred to the Region.

After The Works Department currently consists of 20 persons involved in the engineering and maintenance of physical service (roads, storm drainage, etc.). Solid waste collection is carried out by contract.

The Works Department and the Engineering, Building and Planning Department are supervised by the Co-ordinator - Engineer. Some storm drainage works are designed by consultants for the Town.

(ii) Town of Dundas

Before The responsibility for water distribution in Dundas was vested in the Public Utilities Commission; Five P.U.C. employees were transferred to the Region. A total of 10 works employees associated with the sewage plant and sewer system and two employees assigned to the landfill site were also transferred to the Region. Total staff in 1973 numbered 36 (works plus P.U.C.).

After Dundas has a Building and Engineering department, and a Public Works Department. Both fall under the administration of an Engineering, Public Works and Traffic Committee. The Town regularly employs consultants for engineering design and also purchases planning services from Regional Planning. The Works Department consists of a superintendant, engineering technician and other employees engaged in storm sewer and road maintenance. Two, 2-man crews are used to collect solid waste. Total staff related to these services is now 19.

(iii) Township of Flamborough

Before Prior to 1974, the Township was composed of the Village of Waterdown, East and West Flamborough Townships, and Beverly Township. Each had its own facilities and crews.

Only Waterdown had a municipal water and sewerage system. The former was operated by a Public Utilities Commission (two employees) and the latter by the Ministry of the Environment (one full-time employee). One employee from each was transferred to the Region. Solid waste was collected by contract and was disposed of at the Burlington site by agreement.

The only service provided by the former Townships was solid waste disposal. Only Beverly and West Flamborough Townships maintained sites; East Flamborough used the Burlington site. No personnel were transferred (part time only).

After Flamborough maintains a Road Department which deals with storm drainage as well as roadways. Solid waste collection is handled by contract. A consultant is employed to carry out engineering designs as required.

(iv) Township of Glanbrook

Before Prior to 1974, there were no municipal services in Binbrook or Glanford Township save those related to roads, suburban drainage, and the landfill sites. Each Municipality maintained its own solid waste disposal site, employing a total of three men who were transferred to the Region.

After The new Township maintains a Road Department which also deals with related drainage, and a building inspector. The collection of solid waste is handled by contract. When needed, engineering design is provided by a consultant.

(v) City of Hamilton

Before The former City structure was not unlike the current Regional one. Public Works were handled by an Engineering Department with sections for the following functions: (Note the numbers in parenthesis indicate the number of employees scheduled for transfer to the Region, not the total for each section, Source -Assumption Study).

- Engineering Design and Planning (22)
- Construction (16)

- Technical Services (6)
- Administration (7)
- Surveys (10)
- Municipal Laboratory (16)
- Watermains (80)
- Sewers (23)
- Water Purification Plant Operation (31)
- Sewage Treatment Plant Operation (56)
- Plant Maintenance (27)
- Solid Waste
  - SWARU (63)
  - Landfill sites (9)
  - Collection - Streets and Sanitation (none transferred)
- Roads and Traffic (none transferred)

Total staff related to the above functions was 503 (434 from Engineering and an estimated 69 from the Streets and Sanitation Department). A total of 366 were scheduled for transfer to the Region.

After

Since the Region has assumed all services except local roads and solid waste collection, the Engineering Department has been reduced considerably. The City also "buys" its planning services from the Region.

The current Public Works Department related to physical services is composed of an Engineering Section and a Streets and Sanitation Section. Engineering (staff of 68) deals essentially with roadway design and construction and associated surface drainage; the Department is also heavily involved in the downtown core renewal programme. Streets and Sanitation is still responsible for collection of solid waste and employs a staff of 71 for that purpose. Rental staff (trucks with drivers) are also used for collection. The department is responsible for routine street maintenance, snow ploughing, etc.

(vi) Town of Stoney Creek

Before Prior to 1974, the Town was composed of Saltfleet Township and the "old" Town of Stoney Creek, each with its own staff.

Stoney Creek relied heavily on Hamilton for water supply and sewage disposal and as such carried a minimal staff. Water and sewer mains were looked after by a staff of four. Solid waste collection was contracted and disposal was carried out at the Saltfleet site.

Saltfleet had a five-man sewer and water maintenance crew which was transferred to the Region, as was the landfill site operator. The Engineering staff consisted of seven technical personnel and a survey crew. A total of seven engineering and administrative employees as well as the maintenance crews were transferred to the Region.

Including road maintenance, total works staff consisted of 47 employees.

After The Engineering Department now deals only with building, roads and storm drainage. Solid waste collection is handled by contract. The Department consists of a Town Engineer and a staff of 40 of which four are engaged in building inspection.

(c) Summary

The following Table 2 compares the works staff before and after formation of the Region. It should be noted that these figures do not reflect the total Public Works staff, only those related to physical services. Some figures also reflect road maintenance personnel; where this is the case, these are included in both 1973 and 1977 figures.

TABLE 2

ENGINEERING, OPERATING AND MAINTENANCE
STAFF ASSIGNED TO PHYSICAL SERVICES

Muncipality	1973	Transferred to Region (1)	1977 (2)
Ancaster	20 + 4 P.U.C.	5	20
Dundas	31 + 5 P.U.C.	17	19
Flamborough	1 + 2 P.U.C. (3)	2	*
Glanbrook	3(4)	3	*
Hamilton	503	366	139(5)
Stoney Creek	47	12	36
TOTAL	616	405	214
Region	-	-	429

(1) Figures from assumption report reflect personnel designated for transfer.

(2) 1977 figures from response to JFM questionnaire on physical services.

(3) Water and sewage only.

(4) Solid waste disposal only.

(5) Engineering Department and solid waste collection section only.

*Denotes current staff related to roadway maintenance only.

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As was previously noted, Table 2 does not represent an "accounting perfect" comparison of total works personnel due to reporting discrepancies and division of services. Relatively speaking however, the figures are meaningful.

If the current Regional staff of 429 is added to Area staff of 214, the total is 643 or 27 more than in the 1973 statistics for the same services. The increase of 24 employees in Regional staff (current less transferred) is really not significant when one considers that many part-time staff were previously engaged in the provision of physical services and, accordingly, they were not transferred to the Region. This would likely be particularly evident with P.U.C.'s and solid waste disposal site operations.

Considering the foregoing figures in light of the increased level of service in such areas as solid waste and the services which have been added since 1973, the total personnel, both Regional and Area, does not appear to be out of order. This would indicate that duplication of personnel has not occurred and that some economies of scale are being enjoyed.

The only area where some overlapping of staff may exist relates to roads and storm drainage. At present, several engineering and maintenance staffs are engaged in these activities. The total number of employees would likely be reduced if these functions were consolidated, however it was apparent in interviewing both the Regional and Area personnel that the retention of roads and drainage at the local level was felt to be desirable.

4. Financing of Physical Services

Physical services are financed in several different ways and by various levels of government.

(a) Subsidies, Grants and Loans

Funds may be obtained from both the Federal and Provincial Governments:

(i) Central Mortgage and Housing Corporation

The basic test for CMHC eligibility is that the proposed works "opens up" new lands for residential development in previously undeveloped areas. Projects include trunk storm sewer systems, water supply and trunk distribution works, and sewage treatment works and trunk sewers. The programme applies only to "trunk" works up to the point of first connection to a building. Assistance may take the form of:

- Loans - Loans of up to 2/3 of the eligible cost are available. The duration must not exceed the life of the works; maximum 50 years. At present, loans are available until April 1, 1980.

- Loan Forgiveness - CMHC may forgive 25% of the principal and 25% of the interest in respect of loan advances at date of completion of the work.

- Grants - Where no CMHC loan has been issued, a Municipality may apply for a grant after works are complete. The grant may not exceed 25% of the loan that could have been made available by CMHC.

- Regional Water and Sewerage Plans - CMHC may fund up to 50% of the cost of preparing a Regional Service Plan.

(ii) Ministry of the Environment

The Ministry will provide up to 15 percent of the cost for the construction, alteration, renovation or extension of a water supply or sewage disposal facility.

Grants of up to 50 percent of the cost of Regional solid waste management studies are also available from the Province.

(iii) Ministry of Natural Resources

Assistance to Municipalities is available through the Conservation Authorities for engineering feasibility studies for water control structures and construction and maintenance of channel improvements, erosion control and related works. The normal grant is 55 per cent, but in some instances, supplementary grants are available.

(iv) Ministry of Revenue

Exemption from Provincial Sales Tax on materials to be incorporated in capital works is available to Municipalities (except process equipment).

(v) Government of Canada - Sales Tax

Goods for incorporation in municipal sewerage and drainage systems, and equipment used to treat water are exempt from Federal Sales Tax.

(b) Assessment

The Regional Corporation collects taxes only through the Area Municipality. The system of equalized assessment is used to collect funds to finance Regional roads and solid waste disposal facilities. It should be noted that the solid waste disposal system also generates revenue from charges to non-municipal haulers. In 1977, for instance, fees received from disposal of private wastes reduced the gross disposal cost of $1.22 per ton to 12¢ per ton. This amounted to revenue of approximately $670,000.

Although the Region is responsible for the storm sewers in the City of Hamilton, these costs are not Regional. The costs (except Regional roads drainage) are levied directly against the City and are passed on with taxes applied to property assessment.

Area municipalities apply the cost of storm drainage works against general taxes.

(c) Utility Revenue

Both Regional water and sewage services function as utilities, that is, the rates collected for the use of the service pay all costs of providing it. Only those that use the service are charged.

Prior to formation of the Region, various systems of charging for services were used. In Hamilton, industrial and commercial customers purchased water on a metered basis, while residential charges were related to assessment. Dundas and Ancaster were entirely metered with charges on a sliding scale for water consumed (P.U.C.). Stoney Creek and Flamborough (P.U.C.) had a mixture of metered and flat rate services.

Charges for sewer services varied considerably before January 1, 1974. All costs in Hamilton and Dundas were applied to the general tax levy. The "old" Town of Stoney Creek had a flat rate of $15.00 per year. Ancaster, Saltfleet and Waterdown used a surcharge on the water bills.

During the initial stages of Regional operation, there were disparities in rates charged to the various Municipalities as new, uniform rates were "phased in". The uniform rates are now in effect.

All water rates are based on actual meter readings where these exist (all new services must be metered). In the "old" Town of Stoney Creek and parts of Hamilton which are not metered, rates are based upon assessment and are designed to be equal to the rates of similarly assessed metered homes.

Sanitary sewer services are paid for by means of a surcharge on the water bill. At present, the surcharge is 100 percent and is comprised of two elements:

- sanitary sewer rate (capital cost)	55% of the gross annual water bill
- sanitary sewage service rate	45% of the gross annual water bill

In some instances, buildings are connected to sewers but not water. In such cases the equivalent assessed water rate is used to arrive at sewer charges.

(d) Local Improvements

Services constructed in areas where buildings already exist, as opposed to a new development or subdivision, are constructed under the Local Improvement Act. The principle of funding local improvements is that the abutting land owners pay a nominal cost towards the improvement whether they choose to hook up or not. The cost applied to the owner is based upon a conservative estimate for the installation of certain minimum-sized sewers or watermains.

(e) Subdivision Agreements and Lot Levies

The capital cost of services in new subdivisions is recovered in two ways:

(i) Minimum Services. The developer must pay for the installation of minimum size sewers and watermains (and storm sewers in Hamilton) as set by the Region. Area Municipalities set the size of storm sewers in their own Areas.

Should the Municipality wish to install a larger service, then it pays for all or part of the oversizing. Where a Regional facility is involved, the Region pays for all costs over and above the minimum service. Area Municipalities have their own policies. In Ancaster, for instance, the Municipality pays only for material costs for

storm sewers over 27-inch diameter; in Stoney Creek the policy is similar, but the minimum size is 42-inch diameter.

The developer must also pay for modifications to inlet or outlet works which are required to permit his new system to be interconnected. He pays no part of treatment or pumping facilities.

(ii) Regional Lot Levies. To defray the cost of trunk mains, oversizing, and pumping and treatment facilities, lot levies are assessed against development lands as follows:

- Residential Development. Based on the net lot size, the developer pays a levy for each of the services he installs.

. basic charge	3 3/4¢ per sq. ft.
. water	3 3/4¢ per sq. ft.
. sanitary sewer	3 3/4¢ per sq. ft.
. storm sewer (Hamilton)	3 3/4¢ per sq. ft.

- Multiple dwellings. Developer is charged the above rate plus $220 per unit.

- Other non-industrial lands. Charges are based on the gross building area at the rate of 37¢ per square foot in addition to the lot size charges.

- Industrial lands or redevelopment. Unit charge of $220 only.

(f) Regional Financial Policies

In addition to the terms set forth in By-laws relative to rates, the Regional Council has established certain policies of constraint. The following were adopted on July 18, 1975:

Policies on Capital Financing

1. "That the Region continues its policy of imposing a Capital Levy of 1/4 Mill equalized and that the Capital Levy be used to finance only those Capital Expenditures that would be part of the General Levy;

2. That the Regional Lot Levy be set aside for specific purposes and that if the full lot Levy is charged it be set aside as follows:

   - 40% for Sewers
   - 40% for General Purposes
   - 20% for Water

3. That Water Rates be maintained at a level that will permit all expenditures for Water including Capital Charges to be met from those rates and those surpluses created by Water Rates be set aside only for Water purposes;

4. That the Sewer Surcharge be maintained at a level that will permit all expenditures for Sanitary Sewers including Capital Charges to be met from the Surcharge and that any suplus created by the Surcharge be set aside only for Sanitary Sewer purposes;

5. That the Levy for Storm Sewers be utilized only for Storm Sewer purposes and that all expenditures in respect of Storm Sewers be met from that Levy."

Policies That Limit Debt

6. "That each Area Municipality be requested to establish policies that will enable it to limit its annual Debt Charges for Local Municipal purposes to 20% of the sum of the total Local Municipal Levy (excluding Levies for Regional and School purposes) and all Local Unconditonal Grants;

7. That the Region establish policies that will enable it to limit its annual Debt Charges for all Tax Supported Services except for Water and Sewers to 15% of the sum of the Regional General Levy and all Unconditional Grants and that the Region not issue Debentures on its own behalf for general purposes when that limit is exceeded;

8. That the Region establish policies that will enable it to limit its Annual Debt Charges for Water purposes to 50% of the Water Revenue and that the Region will not issue Debentures for Water purposes on its own behalf when that limit is exceeded;

9. That the Region establish policies that will enable it to limit its annual Debt Charges for Sanitary Sewer purposes to 60% of the Sewer Surcharge and that the Region not issue Debentures for Sanitary Sewer purposes on its own behalf when that limit is exceeded;

10. That the Region cutail the issuance of Debentures when the issuance of further Debentures would make the Annual Debt Charges for all Regional and Area Municipal purposes and Sewer and Water exceed 25% of the sum of the Municipal Levies, Unconditional Grants, Water Revenues and Sewer Surcharges."

5. Rates for Physical Services

(a) Water

Prior to formation of the Region, each Area had individual rates and By-Laws for water services. Tables 3 and 4 following indicate 1973 rates and 1977 rates, and compare typical billings for similar metered consumption under the two systems. Some of the base rates have been obtained from the previously mentioned report on water rates; others were obtained from interviews with Area Municipalities.

After the Region assumed waterworks, rates were modified over a period of 2 or 3 years until they were uniform for all Areas. It should be noted that residential services in the old Town of Stoney Creek and many in Hamilton are still unmetered. The uniform rate schedule is as follows:

- Residential

  . Metered - Quarterly billing $3.69 (3,000 gals) additional, $0.776 per 1000

  . Non Metered Stoney Creek - Flat rate of $38.00 per year

  . Non Metered Hamilton - Schedule based on Assessment (Typical rate for a $5,000 assessment would be $46.74)

TABLE 3

COMPARISON OF RESIDENTIAL WATER RATES

(Based on Metered Consumption of 60,000 Gallons Per Year)

	1973		1977
Municipality	Rates (3/4" services)	60,000 gal. per year	60,000 gal. per year
Ancaster*	$3.33 per month (1000 gal.) .55 per 1000	$66.36	3.69 per quarter (3000 gal.)
Dundas**	6.50 every 2 months (3750 gal.) .96 per 1000 to 10,000 .72 per 1000 above 10,000	79.32	.776 per 1000 Annual $52.00
Flamborough*			
-Waterdown	2.50 every 2 months (1000 gal.) .50 per 1000	42.00	
-East Flam.	5.00 every 2 months (1000 gal.) .60 per 1000	62.40	
Glanbrook	nil	nil	
Hamilton+	10.90 per quarter (10,000 gal.) .4664 per 1000	52.91	
Stoney Creek**			
-Saltfleet	10.00 per quarter (6,000 gal.) .95 per 1000 to 24,000 .75 per 1000 to 70,000	74.20	
-Town (1)	Flat rate $24.00	24.00	38.00
(2)	Metered $6.00 per quarter (6000 gal.) .30 per 1000	34.80	52.00

* denotes rates obtained from Muncipality

** denotes rates obtained from the Rate Study

\+ rates obtained from City Water Works By-law for metered services (effective January 1, 1972). The average annual residential billing on assessment rate is reported to be $33.00.

TABLE 4

COMPARISON OF COMMERCIAL WATER RATES

(Based on Metered Consumption of 40,000 Gallons Per Year)

	1973/1974		1977
Municipality	Rates (1" service)	40,000 gal. per year	40,000 gal. per year
Ancaster*	$7.00 per month (1000 gal.) .80 per 1000	$106.40	
Dundas**	13.00 every 2 months (3750 gal.) .96 per 1000 to 10,000 .72 per 1000 above 10,000	94.80	
Flamborough*			
-Waterdown	3.00 every 2 months (1000 gal.) .50 per 1000	35.00	
-East Flam	6.00 every 2 months .60 per 1000		$19.08 per quarter 10,000 gal. 0.69 per 1000 to 60,000 0.541 per 1000 to 600,000 0.431 per 1000 above 600,000
Glanbrook	nil	nil	
Hamilton+	12.99 per quarter .4664 per 1000 to 60,000 .3646 per 1000 to 600,000 .2928 per 1000 over 600,000	51.96	Annual $76.32
Stoney Creek**			
Saltfleet	10.00 per quarter (6000 gal.) .95 per 1000 to 24,000 .75 per 1000 to 70,000	55.20	
-Town	6.00 per quarter (6000 gal.) .30 per 1000	28.80	

*

** Please refer to Table 3 for notes

+

- Commercial

. Metered - Minimum quarterly billing for first 10,000 gallons varies depending on size of connection:
e.g. 3/4" - $16.00
1" - $19.08
2" - $25.23

Additional Usage, non-dependent on service Size

10,000 to 60,000 gals.	$0.69 per 1000
60,000 to 600,000 gals.	$0.541 per 1000
over 600,000 gals.	$0.431 per 1000

The comparative tabulations show that with the exception of Stoney Creek, rates for residential usage have actually declined in each Area Municipality. Commercial rates have gone down in Ancaster and Dundas and have risen in other Municipalities. It should be emphasized that these rates are based upon a theoretical consumption figure and do not necessarily represent the "average resident's" billing.

Since Regional control of waterworks was initiated, rates have been raised twice, 7 percent in 1967 and 15 percent in 1977. Despite the rise, cost to the average residential consumer for an equal amount of water has decreased although it would appear that this has been at the expense of the commercial-industrial user.

(b) Sanitary Sewage

The Rate Study Report prepared relative to sewerage rates indicates typical average charges for residential units based upon consumption of 60,000 gallons per year, per household. These are listed in the following Table 5 and are compared to current

TABLE 5

COMPARISON OF RESIDENTIAL SEWAGE RATES

(Based on consumption of 60,000 gallons of water)

	1974		1977
Municipality	Method of* Charging	Ave. Household Charge	Ave. Household Charge
Ancaster	125% on water bill	$75.00	100% of water bill
Dundas	General Tax Levy	26.10	$52.00
Flamborough	100% on water bill + 2.26 mils	53.30	
Glanbrook	nil	nil	nil
Hamilton	General Tax Levy	39.96	
Stoney Creek -Saltfleet	40% on water bill plus 18¢ per 1000 gal.	40.48	
-Town	Flat rate	15.00	

* Source - Rate Study

rates, namely 100 percent of the previously calculated "water bills" for consumers using 60,000 gallons per year. It should be noted that rates quoted are for 1974, but are based on the non-Regional provision of services. In the case of Ancaster, rates are theoretical since sewer services were not complete in 1974.

The above mentioned tabulation is not a rigid financial analysis since several assumptions have been required to arrive at the data; the figures do, however, indicate a trend.

Certain rates have increased while others have declined; this may be explained as follows:

- Ancaster - Although the new sewer system constructed by the the Ministry of the Environment was not operating in 1974, the rates shown are those which would have been charged had the system been completed prior to assumption by the Region. Under the 1977 system of uniform rates, the charges to Ancaster residents are reduced considerably because of Regional assumption of the sizable debt.

- Dundas - The low rate before Regional assumption does not include the large debt service charges to be incurred once plant expansion was undertaken.

- Hamilton - The rise reflects the improved degree of treatment required and subsequent expansion of secondary treatment facilities at the Woodward Avenue Plant.

- General - The cost of sewage treatment has accelerated disproportionately relative to waterworks over the past decade due to the demand by Provincial authorities to improve the quality of effluent being discharged. The methods of treatment are in many instances chemically-oriented, and have been subjected to extraordinary escalation in chemical costs over the past few years.

(c) Solid Waste Disposal

Rates for solid waste disposal were not levied separately before Regional assumption but were reflected in the general levy. This practice is still used by the Region, however rates are now uniform and are applied to equalized assessment.

The current cost of solid waste disposal is $4,100,000 per year. This represents a gross unit cost of approximately $10.00 per capita. With the new disposal scheme proposed, the cost is expected to rise in the next few years to $7,900,000 or approximately $19.30 per capita.

(d) Solid Waste Collection

Collection of solid waste remains an Area responsibility, as was the case prior to 1974, and should not therefore be affected by Regional takeover. Some minor increases may have occurred because of increased haul distances resulting from closure of unacceptable sites. These costs cannot, however, be considered a direct result of the Regional assumption.

The following Table 6 does not give a complete, uniform comparison of rates but is included for general information. It should be noted that once the new disposal scheme is initiated, collection costs should actually decline because of the proximity of waste transfer stations to waste collection districts.

(e) Storm Drainage

The cost of storm drainage is assessed by the Area Municipality as part of the general tax rate and is, therefore, difficult to identify as a separate item.

In response to questionnaires, the Area Municipalities have identified the storm drainage costs in Table 7.

TABLE 6

SOLID WASTE COLLECTION COSTS

	1973		1977	
Municipality	Type	Annual Cost per Capita	Type	Annual ** Cost per Capita
Ancaster	Mun. Contract	$ 6.10*	Mun. Contract	$ 5.30
Dundas	Mun. Forces	$ 7.54*	Mun. Forces	$ 5.86
Flamborough -Waterdown	Mun. Contract	$ 4.10	Mun. Contract	$15.44/unit ($4.41/capita) alt. $17.88/uni ($5.10/capita)
-East Flam.	Private	-		
-West Flam.	Private	-		
-Beverly	Private	-		
Glanbrook			Mun. Contract	$24.60/unit ($7.03/capita)
-Glanford	Private	$ 4.37+		
-Binbrook	Private			
Hamilton	Mun. Forces	(approximately $16.00/ton)	Mun. Force	$15.32/ton ($4.78/capita)
Stoney Creek -Saltfleet -Town	Mun. Contract	N/AV	Mun. Contract	$ 7.88

*Denotes that figure reported as inclusive of disposal
**Note: where figures quoted in cost per unit, a factor of 3.5 persons per unit has been used to convert to cost per capita
+Disposal only

TABLE 7

STORM DRAINAGE COSTS

	1973		1977	
	Annual Cost	Cost/Capita	Annual Cost	Cost/Capita
Ancaster	$ 21,333	$ 1.40	$ 97,000	$ 6.84
Dundas	N/AV	N/AV	182,300	14.15
Flamborough	N/AV	N/AV	N/AV	N/AV
Glanbrook	N/AV	N/AV	N/AV	N/AV
Hamilton	N/AV	N/AV	N/AV	N/AV
Stoney Creek	N/AV	N/AV	552,400	41.94

N/AV denotes not available

6. Capital and Operating Expenditures

Capital and operating costs have been difficult to extract from municipal records, a fact which has also been noted by the financial analysts. Data which have been received from Area Municipalities are fragmented and the degree of "accounting accuracy" is unknown. Furthermore, at this writing, information relative to municipalities with the most significant expenditures was not available.

The cost of physical services is a major concern, however it would be erroneous to draw conclusions with the data at hand. It is suggested that the rates provide a good indication of cost trends, and that actual financial data, therefore, be omitted from this report at this time. Once the financial analysts have completed their assignment, the pertinent data can be extracted and appended to this report.

7. General Impression

For the most part, the interviews with officials of the various Area Municipalities reflected a positive attitude towards the current Regional basis for physical services. There was no suggestion that any services be transferred one way or the other.

Some officials, particularly in small communities felt that a loss of personal contact between the resident and those responsible for providing services had occurred. Although some did not feel that this was significant, they did recognize the general reluctance of the taxpayer to deal with senior levels of government.

As would be expected, opinions differed, but the personal service factor did seem to reoccur. It was difficult to establish whether it was a real or psychological problem. All those questioned agreed that complaints referred to the Region by Area officials did not seem to "come back". Thus, although the personal level may not exist, the taxpayer does seem to be getting satisfaction relative to his complaints.

The process of making service applications to two municipal bodies plus special purpose groups such as the Conservation Authorities and the Niagara Escarpment Commission was felt to be cumbersome and confusing to the public. Suggestions were made that the individual should make a single application which would in turn be routed to the appropriate bodies.

Most Area Municipalities were delighted to be rid of the solid waste disposal problem. There was also a concensus of opinion that the Province was remiss in not taking a positive action to alleviate the very costly and painful procedure currently related to the acquisition of landfill sites.

Opinions varied as to the role of the Conservation Authorities. Some indicated excellent relationships with the Authorities while others felt the concept of the Authority was outdated and that it should be eliminated. There seemed to be some indication that the Authorities were attempting to increase their level of involvement.

In summary, political opinions aside, the majority of the Regional and Area Municipalities staff questioned saw the current division of responsibility for physical services as a workable and logical one. No strong recommendations for changes were expressed.

BIBLIOGRAPHY

SECTION 2 - GENERAL CONSIDERATIONS

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WATER SUPPLY & TREATMENT

SECTION 3

1. Introduction

The Act to Establish the Regional Municipality of Hamilton-Wentworth gave the Regional Corporation the sole responsibility for the supply and distribution of water to some 376,000 persons throughout the Regional Area. The Regional government was thus required to assume and operate all: water supply and treatment facilities, pumping stations, storage facilities, and trunk and distribution watermains. For the most part the Region assumed ownership of the facilities, however in a few cases, such as the former Saltfleet Township reservoir, the Ministry of the Environment retained ownership and the Region assumed the financial obligations set forth in the original agreement between the Saltfleet and the Ministry.

Prior to the formation of the Region, the individual municipalities had been responsible for the provision of the water service; some such as Dundas, Ancaster and Flamborough (Waterdown) had provided water through a Public Utilities Commission, others through engineering departments.

The inception of a Regional waterworks system did not have a serious technical impact on most areas; this was the case because the major water user, the City of Hamilton, had for many years supplied water under agreement to Dundas, Stoney Creek, Saltfleet and part of Ancaster. In fact, the immediate change effected by integration of individual systems after January 1, 1974, was simply the elimination of inter-municipality meters.

Figure 1, which may be found at the back of the report, indicates the area served by the Regional waterworks system. The location of the

major facilities (except mains) are shown and are briefly described below:

a) Source of Water

(i) The Primary Source is the waterworks purification plant on Woodward Avenue in the City of Hamilton. Water is drawn from Lake Ontario through a multi-intake system and is conveyed to the plant via a low-lift pumping station. The plant underwent considerable modifications just prior to the formation of the Region and now has a potential peak capacity of 160 million imperial gallons per day (MIGD). The average demand in recent years has been about 70 MIGD. Treatment facilities consist of: pre- and post-chlorination, chemical addition to promote coagulation and settling, and rapid sand filtration.

(ii) A Secondary Water Source associated with the integrated system is the Ancaster well-field: This has a capacity of approximately 2.1 MIGD and at present essentially serves only the Ancaster area.

(iii) Small Isolated Well Systems serve Waterdown, Greensville and Carlisle in Flamborough Township. There are also some private communal systems.

(iv) External Sources: The Region has taken over existing agreements with the Halton Region to supply 0.5 MIGD to Flamborough, and with the Niagara Region (Grimsby) to supply a small amount of water to an isolated area in the Town of Stoney Creek.

b) Pumping Facilities

In order to maintain water pressure in an acceptable range of 40 to 100 pounds per square inch, a series of pressure districts are required. These generally conform to the natural topography of

the area and necessitate a series of pumping and repumping stations to elevate the water from one to the other while maintaining an acceptable pressure range. Only the main stations are shown on Figure 1 to give a general appreciation of the system.

(i) The "Hamilton" System

Water from the main treatment plant is pumped and repumped to provide service to the integrated system in Hamilton, Stoney Creek, Dundas and a small part of Ancaster and Glanbrook.

Most pumping stations located throughout the system have a high reliability factor and are provided with adequate "stand-by" to meet most forseeable problems and routine maintenance procedures. Some minor deficiencies do exist but the current Capital Budget provides funds for the correction of most.

The small area fed from Grimsby will remain for some time, but will eventually be integrated. The quantity taken from Grimsby has been reduced considerably since 1974.

(ii) The Ancaster System

Except for a small portion of Ancaster below the escarpment which is supplied from Hamilton, the main supply is pumped from the well site near Sulphur Springs Road.

Although integration with the Hamilton system has not yet occurred, it is intended that the system in the southwest sector of Hamilton (above the escarpment) be extended into the Town of Ancaster. This would relieve the demand on the wells which could inturn be used to supply that portion of Dundas west of the original Town, and a part of Flamborough Township.

(iii) Isolated Systems

Supplies in the Township of Flamborough utilize pumps at the well sites. The isolated Carlisle well system will remain, but it is planned that the Waterdown wells will eventually be abandoned in favour of a piped supply from the Hamilton plant via Dundas. The Halton Region source will remain to provide dual feed to the area. The Greensville well system will be replaced by supply from Dundas.

c) Storage Reservoirs

Good waterworks practice, as well as requirements set by the fire underwriters, requires that water be stored at a suitable level to provide adequate pressure to the district; in the case of Hamilton-Wentworth, the storage criteria has been set as the volume of water that would be consumed on the maximum day for the year. The provision of such storage ensures system security in the eventuality of a major power failure or equipment problem, and it provides a balancing source of water to meet peak demand, thus allowing the pumping stations to operate at an economic constant rate.

The level of storage in the Hamilton-Wentworth system is for the most part adequate. Deficiencies in Dundas and Waterdown are scheduled for correction in the current five year Capital Budget. Tenders have recently been received for a new storage tank to correct the deficiency that exists at Waterdown because of the poor condition of the existing one.

d) Distribution Mains

It should be noted that although the serviced area is shown on Figure 1 as extending to the east extremity of the Town of Stoney Creek, considerable new works are required to bring this area to "full service" status. Many mains are undersized and tend to provide for linear service, but not full development. Plans to

reinforce and extend mains have been scheduled by the Region for early construction.

Except for Stoney Creek, most mains are adequate for present needs; additions and modifications to correct deficiencies as well as meet increasing demands are scheduled under the five-year Capital Budget.

2. Legislation and By-Laws

a) Act to Establish the Regional Municipality of Hamilton-Wentworth - Bill 155

The Act defines the main responsibilities of the Regional Corporation for water supply as follows:

- The Regional Corporation shall have the sole responsibility for supply and distribution of water in the Regional Area.

- All general and special Acts relating to water supply and distribution by a local board or Municipal Corporations shall apply to the Regional Corporation except the power to establish a Public Utilities Commission.

- The Regional Coporation shall assume all real and personal property, assets, liabilities and surpluses or deficits related to water supply and distribution.

- The Act describes the powers and obligations of the Region with regard to this service.

It should be noted that the Area Municipalities have no direct power under the Act for water supply. This differs considerably from the procedures established for some other areas, such as Metropolitan Toronto and the Regional Municipalities of York and Niagara, where the senior level of government supplies water in trunk mains and the Area Municipalities or Boroughs distribute it. The single level system has been used in Hamilton-Wentworth, Halton, Peel and Durham Regions.

b) General Acts

(i) The Municipal Act

The Municipal Act defines the manner in which a municipality may create By-Laws to impose upon owners or occupants of land who will derive a benefit from waterworks, water rates to pay for a part or the whole cost of capital works. The procedures and methods for computing rates to be applied to the payment of principle and interest for capital works are defined.

(ii) The Local Improvement Act

The Act deals with passing By-Laws, acceptable projects and costs, and the setting of charges against abutting properties for the construction of local watermains. Procedures for petition to the OMB are set forth.

(iii) The Ontario Water Resources Act - Ontario Regulation 54/76

Under this Act, the Director has the power to control and regulate the: collection, production, treatment storage, transmission, distribution and use of water for public purposes. A municipality contemplating the establishment or alteration of water works must submit details and acquire a certificate from the Director before By-Laws to finance the works can be passed. Further, regulations relative to the standards for potable water and the operation of waterworks are provided under the Act.

The Act also sets out procedures for the provision of water works by the Ministry. The Regional Municipality has acquired some works which were constructed under these provisions.

(iv) The Environmental Protection Act

The Act provides for the protection and conservation of the natural environment. It provides for controlling the discharge of contaminants which may impair the quality of the natural environment, cause damage to plant or animal life, or impair the health or safety of persons. For the purpose of water supply, the Act is to be read in conjunction with the Ontario Water Resources Act. Under the terms of these two Acts, the Municipalities must comply with the conditions of design and operation cited in the certificate of approval for the works.

The Act could also require the treatment of waste waters from a water purification plant. In this regard, the Region has already undertaken a study of suitable treatment methods and has budgetted funds to construct facilities at the Woodward Avenue Plant in the early 1980's.

(v) The Public Utilities Act

The Regional Corporation is empowered under Part III of the Public Utilities Act to pass By-Laws for the maintenance and management of waterworks, and by By-Laws or resolution, fix rates or charges for supplying the utility. Part III of the Act deals with public utilities as opposed to Public Utilities Commissions.

(vi) The Public Health Act

The Act empowers the Ministry of Health to make investigations and inquiries into the cause for disease and advise as to public health generally. Under the Act, the designated Medical Officer of Health may test the quality of water in a potable supply system and take action as required to protect the public should the supply prove to be contaminated.

c) Other Legislation

(i) The Planning Act

The Act administered by the Ministry of Housing deals with; the formation and operation of planning boards, official plans, OMB hearings, building By-Laws, zoning etc. Although not directly related to waterworks, the planning process is an integral part of water works planning and is therefore pertinent. The Act also deals with subdivision agreements which include the financing of watermains.

(ii) International Joint Commission

The Commissioner reports and advises the use of Great Lakes waters.

(iii) The Labour Relations Act

The Act deals with the relation between employers and employees relative to: collective bargaining, unions, negotiation, arbitration, unfair practice, etc. It covers working conditions applicable to the operation and maintenance of waterworks facilities.

(iv) The Industrial Safety Act

Municipalities contemplating the construction of a treatment facility or pumping station must submit plans and specifications for review by the Ministry of Labour. The Act further defines the duties of an employer relative to the safety of a structure or equipment, and the provision of proper working conditions.

The foregoing Acts are those most pertinent to the construction and operation of a waterworks system. Obviously, many others are of peripheral concern but are not significant to the review.

d) Regional Municipality of Hamilton-Wentworth - By-Law 58-74 (as amended)

The Waterworks By-Law provides for the maintenance and management of the Regional Waterworks System and for the setting of rates or charges for the supply of water. The responsibility for the administration and enforcement of the By-Law and the construction of waterworks lies with the Commissioner of Engineering.

Briefly the By-Law deals with the following:

- application for water services, the fees and details for construction, penalties

- installation of water meters by the Municipality on all new services and retention of all existing meters, accessibility for reading meters, owners rights to have meters tested

- fire protection systems and protection of potable water from direct connection to potential contaminating sources, protection of system from freezing, use of hydrants, swimming pool restrictions

- regulations to prevent wastage of water; lawn watering restrictions, prohibition of water cooled air conditioner without recycling systems

- rates
  - Domestic - metered - schedule
  - Domestic - non-metered
    - Part of Hamilton - schedule
    - Stoney Creek - $38.00/yr
  - Commercial Industrial - metered
  - Hydrant charge to Area - $75.00/yr each
  - Connections - schedule
  - Tank Trucks - $1.25/1000 gallon
  - Supply outside Region - 50% surcharge
  - Service connection - schedule.

3. General Description

The waterworks system is administered by the Regional Commissioner of Engineering with three basic areas of responsibility (see Section 2 for details):

(i) planning, design and construction,

(ii) maintenance,

(iii) operations.

Although the Regional Department of Engineering has been responsible for waterworks for less than three years, the key administrative, planning, engineering, and operating and maintenance personnel are previous long-term employees of the City of Hamilton. Thus, the responsible personnel are familiar with the City system, and many of the surrounding Area systems which received water from the City. The waterworks system developed and operated by the City of Hamilton was a progressive, well-operated service; this same level of competent development and operation is now being practiced by Regional staff.

Development of a water system is a complex combination of planning and engineering decisions. The system expansion must be scheduled to meet the growing needs of the Region while still adhering to the economic constraints of keeping capital costs compatible with revenue from reasonable user-rates. The key to water consumption in a particular community, and hence sizing, scheduling and location of facilities, is the spatial distribution of population and industrial development. The concept of planning on a Regional scale provides a reasonably firm indication of scheduled development throughout the entire area; thus system development can be planned well in advance of needs with the reduced liklihood of major development shifts which can result in waterworks facilities in the wrong place. In this regard, the Region has developed a master plan for waterworks facilities to the year 1995 based upon the most current planning data and consumption trends.

The introduction to this Section provides the general description of the Regional waterworks system. The following deals with each Area Municipality individually and describes the system before and after the formation of the Region.

a) The Town of Ancaster

Prior to formation of the Regional Corporation water supply in the Township of Ancaster was restricted to the area generally around and in the old Town. The bulk of the water came from wells (major ones on the north side of the Town near Sulphur Springs Road), and although quality was, and still is, quite good, there were certain constraints on quantity. A very small amount of water was also taken from the City of Hamilton to provide service to about 40 homes in the lower part of the serviced area. The operation of the supply and distribution system was under the control of the Public Utilities Commission.

As early as 1971 the Hamilton Wentworth Planning Board, City officials and the P.U.C. discussed the supply of City water to the area generally east of Southgate Road. It was anticipated then that an ultimate population of 21,000 persons could be served by the City system.

With the advent of the Regional Corporation, the P.U.C. transfered the system to the Region and plans were made to integrate it with the primary City supply network. To date no major changes have been made to the system, however, the recent waterworks master plan prepared for the Region and the 1977 Capital Budget indicate a scheduled change from well to Lake supply over the next 20 years to serve approximately 23,500 persons. Some minor watermains have already been constructed and the well supply has been increased slightly.

Previous pressure boundaries within the City system above the escarpment have been extended west to Highway 403. The construction of watermains from the western extremity of the City network on

Highway 53, to Fidlers Green Road are included in the Capital Budget for 1978-1980. A booster pumping station to be built in conjunction with the main is also scheduled for 1979-1980. Mains from the existing system to provide water for the first phase of a proposed 600 acre industrial development at Duff's Corners are included in the Capital Budget for the 1979-1980 period. It should be noted that the proposal to develop industrial lands at Duff's Corners was initiated to satisfy a demand by industry to locate in the Brantford - Toronto corridor.

Once the "City" supply is integrated with Ancaster's system, the existing well-field can be efficiently utilized to provide water to the west-end of Dundas and eventually to Greensville. Capital funds have been allocated to increase the capability of the well-field by 1.0 MIGD in 1977-1978.

b) The Town of Dundas

The Dundas water system under the control of a Public Utilities Commission provided a municipal water supply to the 16,000 residents within the original Town boundaries prior to 1974; all water was purchased from the City of Hamilton. Water was taken from a point on Main Street West in the City and was pumped into the Dundas system through a Town-owned pumping station. Under the terms of the agreement, the City supplied water to the municipal boundary at a rate not to exceed the maximum day rate; this was generally accepted to be twice the average, or about 2 MIGD. The Town was obliged to provide an elevated storage facility with capacity of at least twice the average day demand. Two reservoirs were part of the P.U.C. system.

The Act which formed the Regional Corporation extended the limits of Dundas to include two parcels of land, one to the east and the other to the west. These areas were annexed from the Townships of West Flamborough and Ancaster and contained no serviced lands. To a large extent the land to the east is designated as greenbelt, although some development land is available. However, the bulk of

future development will occur to the west; that is, adjacent to Ancaster.

Regional plans for serving the western development area include the expansion of the Ancaster well field, an additional 3.0 MIGD reservoir and new watermains in the Morden Neighbourhood area in the 1978-1979 period.

In conjunction with the expanded well field and reservoir, a new pumping station is planned in the same area (1980) to withdraw water from the system and provide a municipal water service to the 3000 people in Greensville - Glenwood Heights area in Flamborough who currently rely on private or communal well supplies.

This represents an excellent example of the possibilities for service available under a Regional system. In this particular area, three Area Municipality boundaries are in very close proximity. By providing readily available water to Ancaster, the Ancaster wells are freed to supply Dundas; the reservoir required for the area can inturn be used as the source for a pumping station to supply Flamborough. It should be noted that had water been supplied to this part of Dundas through the original Hamilton-Dundas network, considerable rebuilding of mains would have been required in the older part of the Town.

A second reservoir is also scheduled for Dundas in 1977-1978. This would consist of a connecting watermain and a 2.0 MIGD cell at the York Road site. The additional capacity is required to meet the storage needs of the Dundas central business district. An additional 4.0 MIGD cell is also scheduled for 1981-1982. The reservoir will then have the capability to act as the source for a pumping station to provide water to Flamborough (Waterdown).

Again the advantage of an integrated system is apparent; the system provides economic expansion potential for Dundas and Flamborough as well as system security.

c) The Township of Flamborough

The Township of Flamborough represents an amalgamation of the Village of Waterdown, East Flamborough and parts of Beverley and West Flamborough Townships. Prior to 1974 the only major serviced area was Waterdown. Private communal well systems also existed in Carlisle, Greensville and Willdan subdivision.

The Waterdown system which was under control of a P.U.C. before 1974, takes water from a local well supply and from the Halton Region system. The latter represents a long-term agreement providing up to 0.5 MIGD. Although the well supply is reported to be of acceptable quality, it does not provide reliable quantity. This deficiency, as well as an elevated tank which is beyond repair, existed prior to 1974. The village had taken action to replace the tank prior to 1974.

The Regional Corporation has proceded with the design and has recently closed tenders for a new $1.0 million storage facility. The water distribution system has also been extended to the east and west to service the Highgate and Rockcliffe developments. Part of the latter area was experiencing pollution of wells by septic tank effluent.

Ultimate plans call for the abandonment of the well supply in favour of lake water via Hamilton and Dundas. As noted previously, a source reservoir will be constructed in Dundas. The Capital Budget for 1977 also allocates funds to build a 2.0 MIGD pumping station at the reservoir site in 1981-1982 and watermains to Clappison Corners in 1981-1982; the system would eventually be extended to Waterdown. It is planned that the Halton supply be retained to enhance system security.

Although the Waterdown system was reasonably acceptable for the supply to the 2400 people in the village itself and about 600 in East Flamborough, major expansion into the surrounding Township under P.U.C. operation seemed unlikely. Thus the development in the

area around Waterdown was dependent on individual well supplies. Since the local aquifer is reportedly not capable of supporting sustained pumping and in some instances has yielded sulphur water, this may not have been feasible. In terms of the village itself, the cost of the new storage facility would have imposed an economic burden on the small community. The multi-million dollar, proposed Hamilton-Dundas-Flamborough water supply scheme would not only have been financially prohibitive for the individual municipalities, but would have entailed a series of inter-municipal agreements which may have been impossible to arrange.

As previously noted, a new pumping station is planned in 1980 to supply water to the 3000 residents of Greensville and Glenwood Heights thus permitting the communal well systems to be abandoned.

d) The Township of Glanbrook

The Township is composed of the previous Townships of Glanford and Binbrook, and includes the communities of Mount Hope and Binbrook. Prior to 1974 there were no municipal water services to the 10,000 residents in the two Townships; a supply existed from the City to the Hamilton airport at Mount Hope, but that served only the airport facilities. Many wells, particularly in the area around Mount Hope, were dug in a shallow sand-gravel strata and pollution from septic tank effluent was a major problem.

When the Region assumed water supply responsibilities in 1974, plans were initiated to correct the potential health problem associated with contamination; accordingly water supply mains have been extended from the City network to the Aldercrest subdivision and the development along Miles Road. These services have been provided as local improvements for which the abutting owners pay only a fraction of actual costs. From a financial, as well as technical supply viewpoint, the Regional involvement in providing these services has been a definite benefit to the welfare of the community.

On the surface it may appear that the Township has derived little benefit from the Regional system, however, it must be recognized that the Area Council has approved no subdivision proposals since January 1, 1974, pending the development of an Official Plan. The draft Plan was published in June 1977 and subsequent to recent discussions with the Regional Planning and Development Department, the Council passed a resolution on November 21, 1977 authorizing the Clerk to accept subdivision proposals.

Under the master plan for the Regional waterworks system, provision has been made to service a large industrial tract adjacent to the City limits. Tentative plans have also been made to accommodate servicing of Bimbrook subject to finalization of the development patterns for the Region.

e) The City of Hamilton

The City waterworks system forms the backbone of the Regional service both in terms of physical plant and experienced personnel who have been transferred to the Region. The City's attitude towards water supply has been a progressive one; this is illustrated by the development of a master plan in 1971. The City has adhered to that plan so that system deficiencies have been rectified, and provision for future demands have been made on a well scheduled basis. Prior to Regional assumption, the system was in a state of excellent repair and was capable of meeting all City demand criteria as well as providing all supply to the surrounding communities of Stoney Creek, Saltfleet, Dundas and a small part of Ancaster.

In terms of system reliability and provision for development, the Regional concept has had little impact on the City system, particularly since the areas served have changed very little; the cost of treatment facilities and so forth were already borne to some degree by Area Municipalities through their purchase of water from the City. Rates charged for residential water service have not been increased and in fact, the City rate has been generally used in the establishment of uniform Regional rates in 1976.

of inter-municipal metering which necessarily restricted the number of interconnections. Without these restrictions mains have been looped to provide better pressures. An intermediate City pressure zone has also been extended into Stoney Creek to correct low pressure conditions. By interconnection of the former separate systems, the need to replace the old Stoney Creek reservoir has also been eliminated. The 1977 Capital Budget designates additional main construction to overcome system deficiencies.

The Region has assumed the capital debt for the former Saltfleet reservoir (which is owned by the Ministry of the Environment) and is currently constructing a new high pressure pumping station in the east end of Hamilton to raise water to the system located above the escarpment. A large feeder main will also be constructed in conjunction with the station. This facility will provide all the future water requirements for Saltfleet Community Development, thus allowing continued expansion in that part of Stoney Creek.

4. Responsibility for Policy and Financing

Planning of a waterworks system, like all other physical services, simply reflects the existing requirements and proposed development patterns for the municipality. Planning, however, must be carried out recognizing the logical and economic provision of services. Thus, although it is the Regional Engineering Department which directly controls the provision of the water service, the Planning and Development Department makes a major contribution to the scheduling and direction of this service.

The key document relative to future development patterns is the Regional Official Plan to which all Area Municipalities plans must conform. Responsibility for the Official Plan (which is yet to be passed) is vested in the Regional Council who in turn also have the power to approve plans of subdivision within the Area Municipalities. Thus, in a sense, the planning of waterworks needs is a function of the Planning Department.

The Area Municipalities have no direct influence on the planning and design of waterworks, the setting of rates and the approval of capital expenditures, except through their political representation on Regional Council. Individuals may make representation to the Committee of Engineering Services as noted in Section 2. Waterworks is purely a Regional function and as such there is no duplication of service between the Area Municipalities and Regional Municipality.

It is noteworthy, however, that in the total planning of the Region, and thus eventually the scope of the services, the Regional Corporation has made serious efforts to involve the public and the Area Municipalities. In this regard, reference is made to the report entitled "A Regional Development Pattern for Hamilton-Wentworth" prepared by the Regional Planning and Development Department, September 1977. The report presents several alternatives for Regional development. One of these represents the pattern preferred by the Area Municipality Councils, another that preferred by individuals and groups who attended public meetings and presented briefs relative to Regional development.

The various plans were considered by the Department and were utilized in the preparation of a "recommended plan". This input will eventually become incorporated in the Official Plan for the Region.

Policies for the supply of water service are developed by Regional Council through the passing of By-Laws and resolutions. The Waterworks By-Law was described previously, however, it is supplemented by policies adopted by Regional Council such as that of July 18, 1975 which is recited in Section 2.

Other levels of government which have some control of the quality and cost of servicing include:

a) The Ministry of the Environment, Ontario

The Ministry, through the Water Resources Act and the Environmental Protection Act, controls the quality of water and the design and

operation of facilities. Through a system of subsidies on certain works, they also exert a certain degree of cost control.

b) The Ministry of Health, Ontario

The Medical Officer of Health is empowered to monitor potable water quality and take necessary action to protect public health.

c) The Ontario Municipal Board

The Board reviews the allocation of funds for capital works and monitors the capability of a Municipality to incur debt; it therefore exerts an influence on the cost and extent of services that can be constructed.

d) Central Mortgage and Housing Corporation

CMHC provides loans and grants for waterworks which relate to the development of land and thus have considerable influence on the net cost of services to the taxpayers.

(e) The Niagara Escarpment Commission

The Commission exercises control of development along the escarpment and frequently enters the Regional development picture relative to reservoirs and pumping stations which are often sited on the escarpment slope.

5. Financing

Details of financing are covered in Section 2, however, the general methods are repeated here for completeness of this Section.

The waterworks system operates as a utility, paying for all costs associated with capital construction, operation and maintenance from the revenue received through water rates (except capital costs associated with development agreements and local improvements).

Only those connected to the water system pay for the service, either on a direct meter-reading basis or on a fixed schedule where meters do not exist as is the situation in some parts of Hamilton and in the "old" Town of Stoney Creek. In the case of non-metered residences, rates are based upon metered houses with similar assessment. The residential rate in "old" Stoney Creek is a flat $38.00 per year. All commercial, industrial and institutional customers are metered.

As of 1976, rates for water are uniform throughout the Region and are generally equal to or less than those associated with separate supply of service.

Developers must agree to pay for the installation of watermains of a minimum size in a new area; should the Region require a larger size then the Region pays for the difference between the minimum and the actual. In addition to the minimum size cost, the developer must also pay a lot levy of so much per square foot or per unit in the case of multiple dwellings. The levy is used for both water and sewage works as well as for general purposes.

Where watermains are installed as local improvements (previously developed area), charges are assessed directly to the abutting land owners regardless of whether they choose to connect to the system or not. The charge to the owner is a nominal one based upon a conservative estimate to install an 8-inch diameter main.

Subsidies, grants, loans and forgiveness of loans are available from various Federal and Provincial agencies for constructing waterworks which meet the eligibility requirements for the agency. Again, details may be found in Section 2.

a) Central Mortgage and Housing (CMHC)

Under Part VIII of the National Housing Act waterworks are eligible for consideration by CMHC only when they "open up land for residential development" that was "previously undeveloped". This includes

intakes, treatment plants, pumping stations and mains. Mains are eligible only to the first service connection within the subdivision. Mains supplying new as well as existing development are eligible pro-rata based on a CMHC formula.

b) The Ministry of the Environment, Ontario

The Ministry provides grants for waterworks facilities. Once a Preliminary Certificate has been obtained for the design, the Municipality can make Application for Assistance. Grants may be provided up to a maximum of 15 percent of the final project cost. Interim payment of 10 percent of the estimated value can be obtained when the project is 50 percent complete.

6. Summary

The Regional assumption of all waterwork facilities has resulted in a higher level of service to all customers with the possible exception of the City of Hamilton. Although the system was initiated less than four years ago, significant steps have already been taken to correct the deficiencies that were evident in the various Area systems. Of more importance is the fact that an integrated approach has been taken to the planning of future services without concern for Area Municipality boundaries. The results of removing previous planning constraints are fairly obvious; areas which had little likelihood of service prior to 1974 are now being opened for development and communities with water problems are scheduled to receive adequate quantities of good potable water.

In addition to the planning advantages afforded by the Regional concept, the elimination of municipal service boundaries allows the best use of all Area facilities to provide adequate service at least cost. Of particular benefit to small communities is the broad capital base which permits establishing facilities sized for future needs, rather than simply providing marginal works to correct outstanding deficiencies or immediate requirements. Although this short term practice is more costly in the long-run, the small

community acting alone with limited resources has little option. By the same token, a small community which has reached the limits of its system can rarely afford to open additional development areas because of the major expenditure in developing a new source of water or treatment facility; in many instances the community simply has no future.

The integration of several systems permits an economy of scale and sharing of facilities. By way of example, two small reservoirs can easily cost two to three times as much as one large one. Similar advantages exist with pumping stations, watermains and most notably with water supply and treatment facilities.

In terms of system operation, again economies of scale usually exist. Larger operating departments can take best advantage of discounts for purchase of supplies and equipment, and can reduce the size of spare parts inventory by using a common stock. Better maintenance procedures are generally attributed to larger systems which attract many experienced personnel; the frequency of service and thus the longevity of equipment can also be controlled more readily by computer techniques available to the larger municipality.

It is possible that inter-municipal schemes such as those to supply Waterdown (involving Hamilton, Dundas, Flamborough) as that to serve Greensville (involving Hamilton, Ancaster, Dundas, Flamborough) could have been arranged without a Regional Government. However, it is not difficult to imagine the problems involved in preparing agreements between four municipalities, arriving at a technically and politcally feasible scheme and sorting out cost and benefit formulas.

Without the sharing of costs an individual municipality such as Flamborough could not consider such a scheme; in fact, even the cost of a single element such as a new water storage facility would be a severe economic burden.

Relative to the advantages of a one- or two-tier delivery system, the major advantage of the latter is the retention of contact between the individual served and the Area Municipality officials. The two-tier water system appears to work well in Metropolitan Toronto, however the size of that system may very well merit it.

For the most part, there is little complaint with the one-tier system for water supply. Although residents appear to be reluctant to deal with senior levels of government, during the course of the interviews with Area Municipalities there was little, if any, recollection that complaints passed along to the Region had not been satisfactorily dealt with.

A water system the size of that in Hamilton-Wentworth appears to be well suited to the single-tier concept and enjoys the economics of non-duplication of administrative and operating departments.

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SEWERAGE & SEWAGE TREATMENT

SECTION 4

1. Introduction

Under Bill 155 - An Act to establish the Regional Municipality of Hamilton-Wentworth - the Regional Corporation assumed the sole responsibility for the collection and disposal of all sewage.

Since its formation, the Region has expanded its sewage collection system to meet the increasing demands of the suburban developments as well as those of the newly redeveloped areas. The system now serves 363,000 residents. In addition, the Region had to take drastic steps to extend and improve its treatment facilities, not only to meet the overall increased sewage flows in the Region, but also to meet the much stricter requirements imposed in the early years of this decade on all municipalities in the Province by the Ministry of the Environment (MOE) under the recommendations of the International Joint Commission and other regulatory agencies. Several local programs were at the time of the Region's formation already in the planning stages, and these programs had to be continued and completed by the Region, or in the case of MOE financial programmes, by the Province.

Sewage produced in those areas of the Region which are served by sanitary sewers is currently being treated by one of the following regional treatment plants:

Woodward Avenue (Hamilton) Treatment Plant[2]	average capacity 60 MIGD[1]

King Street (Dundas) Treatment Plant(3)	average capacity 2 MIGD
Waterdown Treatment Plant(4)	average capacity 0.3 MIGD

Notes:

(1) MIGD refers to Million Imperial Gallons per day.

(2) The (Hamilton) Woodward Avenue Treatment Plant is owned partly by the Region and partly by MOE. The latter financed the latest major expansion program. All operations are by Regional staff.

(3) The (Dundas) King Street Plant is owned and operated by the Region. Currently an expansion program is underway to enlarge its average capacity to 4 MIGD, beyond which no further expansion of this plant will be possible unless its effluent is diverted around Cootes Paradise Bay directly to Hamilton Harbour.

(4) The Waterdown Treatment Plant is also owned and operated by the Region. Its capacity is currently being enlarged to an average flow of 0.6 MIGD which represents the maximum flow that can be treated at this location and discharged to the Grindstone Creek.

Prior to the formation of the Region, it was the policy of the Area Municipalities to accept, as much as practical, industrial wastewater in their sanitary sewer system. This concept has been followed by the Regional Corporation. However, certain restrictions are imposed on the quality and quantity of such industrial wastes.

Those areas of the Region which are serviced by sanitary sewers are shown, together with the location of the Treatment Plants and Sewage Pumping Stations, on Figure 2 at the end of this report. All other

areas are still on septic tanks with the exception of a small portion of the Town of Stoney Creek which is served by a privately owned and operated lagoon. Septic tank wastes are accepted at the three Regional sewage treatment plants upon payment of an appropriate fee.

2. Legislation

The following Legislation and Acts cover the most significant aspects of sewerage and sewage treatment in the Regional Municipality of Hamilton-Wentworth:

Municipal

- Bill 155 - An Act to establish the Regional Municipality of Hamilton-Wentworth, including:
  - The Regional Municipality of Hamilton-Wentworth, By-law No. 1-75.
  - The Regional Municipality of Hamilton-Wentworth, By-law No. 2-75.

- The Municipal Act.

- The Local Improvement Act.

- The National Housing Act.

Discharge Control and Level of Treatment

- International Joint Commission Regulations.

- The Environmental Protection Act.

- The Ontario Water Resources Act.

- The Public Health Act.

Management (Operations, Maintenance, Safety, etc.)

- The Labour Relations Act.

- The Industrial Safety Act.

The applicable highlights of the foregoing acts are summarized as follows:

An Act to Establish the Regional Municipality of Hamilton-Wentworth

This Act establishes the duties and responsibilities of the Regional Corporation and states in general terms that the Regional Corporation will be responsible for the entire sewage collection, treatment and disposal systems in the Regional Area. All sewage works, sewer systems and treatment works and all real and personal property of any nature used for the sole purpose of the collection and disposal of such sewage is vested in the Regional Corporation.

This Act also provides for financing of the whole or portion of the Regional expenditures for the maintenance, operation and debt services of the sewerage system by imposing appropriate sewage rates. By-Laws No. 1-75 and 2-75 deal with the management of the entire sewerage system and establish such sewage rates as percentages of the Regional water rates.

The Municipal Act

This Act details in part how municipalities may impose sewer rates to finance in whole, or in part, capital expenditures as well as operational costs for sewerage and sewage treatment works.

The Local Improvement Act

This Act provides for levying appropriate charges for the construction of local sewers against the adjacent properties.

The National Housing Act

Under this Act CMHC loans and grants can be made by the Federal Government to assist Municipalities in the construction or expansion of sewage works.

International Joint Commission (A Combined Canadian - U.S. Body)

The International Joint Commission (IJC) regulates the use of the Great Lake Waters. It defines the level of sewage and waste treatment required prior to discharge into the Great Lakes and specifies unacceptable contaminants. The enforcing of these regulations is delegated to those Provinces and States (U.S.) bordering the Great Lake waters.

The Environmental Protection Act

"The purpose of this Act is to provide for the protection and conservation of the natural environment".

Specifically this Act prohibits the discharge of contaminants in excess of the prescribed amounts and/or concentrations. Under the power of this Act, the Province of Ontario establishes the allowable discharge from all sewage treatment works.

The Ontario Water Resources Act

The construction, installation, alteration or extension of sewerage and sewage treatment works is subject to prior approval by the Ministry of the Environment under this Act as well as under the Environmental Protection Act.

The Public Health Act

The Ministry of Health has, under this Act, the authority to direct a municipality to establish, improve, enlarge or renew sewerage or

sewage treatment works if, in the opinion of the Medical Officer of Health, it is in the interest of the public health to do so.

The Labour Relations Act

This Act covers working conditions and facilities for the accommodation of operations and maintenance staff.

The Industrial Safety Act

This Act relates to safety standards in operations and maintenance.

3. General Description

In general, a municipal sewerage system can be divided into two major categories, the Sewage Collection System and the Sewage Treatment System.

(a) Sewage Collection System

Prior to the Region's formation, certain built-up areas in the City of Hamilton and the County of Wentworth were serviced by sanitary sewers, while the remaining areas used septic tanks or holding tanks. Maintenance and repairs to the sewers and house connection was accomplished by the Area Municipalities, who had their maintenance crews locally available for emergency repairs. With the exception of the City of Hamilton, local tax payers could call on such services, when trouble occurred in their lateral house connections, and the maintenance work would be charged back by the area municipality to the home owner if the trouble spot was found to be on the owner's property. If the problem occurred on street property, the costs were borne by the Municipality.

All sewers have now been taken over by the Region, and all maintenance and repairs are being done by Regional forces. However, the entire lateral, including the portion on the street allowance up to the sewer connection, now falls under the responsibility of the home

owner, who must make his own arrangements to get this pipe serviced if trouble occurs, similar to the original arrangement in the City of Hamilton. At the time the Region was formed, the following main areas of concern existed in the collection system:

(i) No sanitary sewers existed in Ancaster. The Ministry of the Environment had initiated a $12 million program to install a complete sewer system.

(ii) A part of the original Township of Saltfleet (now a part of the Town of Stoney Creek) in the Winona area was (and still is) serviced by a privately owned lagoon. This area should be connected through a sewer or forcemain with the trunk sewer in Stoney Creek to direct all its sewage to the Woodward Avenue Plant. Differences of opinion between various Provincial agencies as to the most acceptable solution have to date prevented the Region from bringing this item to an appropriate solution.

(b) Sewage Treatment System

Prior to the Region's formation, most sewage collected in the sanitary sewers received partial treatment only.

(i) In 1974 the Woodward Avenue (Hamilton) Sewage Treatment Plant was still providing primary treatment only, while an extensive expansion program was under construction to add secondary treatment facilitites to treat average design flows of up to 60 MIGD. Due to the high capital costs ($20 million) involved at the inception of this programme, the City of Hamilton requested that this be financed by the MOE. Major problems arose during construction and litigation is still pending between the bankrupt general contractor and MOE, while the plant did not go into full operation until 1976. All financial obligations are now assumed by the Region, and until all debts are paid to the Ministry, the plant will be partly owned by the Ministry

and partly by the Region. Sewage is now receiving full secondary treatment, including removal of phosphorous, all to the MOE and IJC requirements as set out under the Environmental Protection Act.

(ii) The King Street (Dundas) Plant was owned and operated by the Town of Dundas. It was an old plant which was overloaded and periodically caused odours in the neighbourhood. An expansion program is now underway to increase its capacity to an average design flow of 4 MIGD while, following secondary treatment, tertiary treatment will be provided by aeration of the upper reaches of the Desjardin Canal. This should eliminate most of the odour complaints in the area and should comply with the MOE effluent objectives for Cootes Paradise Bay. Development in Dundas has been curtailed pending completion of the treatment plant expansion.

(iii) The Village of Waterdown was (and is) served by a conventional treatment plant with outfall to Grindstone Creek. This plant, with a capacity of 0.3 MIGD, served the original built-up area, but had no additional capacity for new developments. It was owned and operated by the MOE until the Region took the plant over, including all financing and operations. The plant is now being expanded to an average design flow of 0.6 MIGD to accommodate some new sub-divisions. This expansion represents the maximum receiving capability of the Grindstone Creek, and any further sewage flows must be treated elsewhere, either at the Dundas Plant or at the Skyway Pollution Control Centre in the Regional Municipality of Halton.

(iv) In addition to the foregoing treatment facilities, some areas in Saltfleet Township were serviced by a privately owned and operated lagoon. No change has been made in this area since the formation of the Region.

(c) System Capability

The entire sewerage system in the Region, including the sewers (collection system) and treatment plants (treatment system), is now capable of servicing all built-up areas while provision is being made to service future developments generally in line with the Region's recommended development pattern. To effect this, the Regional Corporation has initiated a program under which major trunk sewers and pumping stations are being planned and constructed while proper provision for plant extensions is provided at the treatment centres. The entire system can now be planned and extended without concern for local municipal boundaries, keeping in mind the most practical solution for the Region as a whole, viz:

(i) Development around Waterdown will probably be serviced by a forcemain to the Dundas Treatment Plant.

(ii) Major trunk sewers are under construction through the City of Hamilton to serve the Township of Glanbrook and other area municipalities in the future.

(iii) Sewage from Ancaster may, in part, be directed and treated in the Dundas plant, with the remainder going to the Woodward Avenue Plant.

(iv) All sewage from the Town of Stoney Creek will be treated at the Woodward Avenue Plant.

(d) Services Within the Boundaries of the Area Municipalities Before and After Regionalization

(i) Town of Ancaster

Before: Before the Region was formed in 1974, Ancaster did not have any sanitary sewers, being serviced completed by private septic tanks. MOE initiated and financed a complete sewerage system and between 1974 and 1976 some 34

miles of separate sanitary sewers, including pumping stations and forcemains, have been installed.

After: The complete system is now being operated by the Region but is still owned by the Province. All sewage is being directed to the Woodward Avenue (Hamilton) plant, but eventually some will be directed to the new Dundas Plant. Industrial wastes do not present any problems at this time.

(ii) Town of Dundas

Before: Prior to 1974, practically the entire Town (as then defined) was served by separate sanitary sewers, with only isolated homes being served by septic tanks. The rural area which was annexed to the Town of Dundas in 1974, was completely on septic tanks. The collected sewage was being treated at the King Street Treatment Plant which was heavily overloaded and pollution of the Desjardins Canal and the Cootes Paradise Bay, as well as odour nuisance was prevelant. Development in the area was frozen pending expansion of the plant.

After: Several large (54-inch and 48-inch diameter) trunk sewers are under construction. In addition expansion of the King Street Sewage Plant was initiated by the Region and is now underway. On this basis, the development of some 1500 housing units has recently been approved. Long term plans call for extensions to the collection system as well as for a new treatment plant to serve the Town of Dundas and some parts of the Town of Ancaster and the Township of Flamborough (i.e. Waterdown).

Industrial wastes in the Town of Dundas do not present any problem in the treatment plant and are accepted in the sewer systems.

(iii) Township of Flamborough

Before: The only sewered area was the Village of Waterdown, which treated its sewage in a MOE owned and operated treatment plant. The Village was fully developed and the plant had reached its maximum capacity. There was little incentive to the Village to increase the treatment capacity, and development in the adjacent municipalities was halted due to lack of proper treatment facilities. All areas outside the Village were serviced by septic tanks while some outside industries used lagoons.

After: Since the Region's formation, at which time the entire plant and the collection system were taken over by the Region from the Province, steps have been taken to double the capacity of the Waterdown Plant. This will allow the development of two sub-divisions to house some 3000 additional people. The plant can not be expanded any further, and long term planning by the Region provides for abandoning the Waterdown Plant and pumping all sewage about 6 miles to the (new) Dundas Plant. (Alternatively, the sewage could be directed easterly to the Regional Municipality of Halton for treatment at their Skyway Pollution Control Centre.)

There are, at present, no industrial users of the sewage system.

(iv) Township of Glanbrook

Before: No sanitary sewers were provided. All existing development was serviced by septic tanks. No long range plans were initiated to provide sewers.

After: To date, no actual sewers have been installed in the Township. However, the Region has initiated and partly constructed trunk sewers in the City of Hamilton which,

when reaching the Township boundary, will be able to transport sewage to the Woodward Avenue Treatment Plant in Hamilton. It is expected that this will occur in 1978, and plans are being developed for service to Binbrook by means of a sewage pumping station and forcemain as soon as these trunk sewers are available.

(v) City of Hamilton

Before: The City of Hamilton was serving almost all its built-up areas with sewers, and was keeping up with new developments. (Some septic tanks existed in the extreme southerly part of the City.) All sewers constructed prior to 1960, i.e. many sewers below the escarpment (generally the area west of Red Hill Creek) and some sewers in the north section of the developed area above the escarpment, are of the combined type. This type of sewer system is not uncommon in older, well established communities, with all roof drainage, weeping tiles, road drainage, etc. discharging into one common sewer with the sanitary wastes. Later practice in the sanitary field developed the separated sewer system, where the sanitary sewers carry the wastes to the treatment plants while the storm sewers discharge directly into the rivers or lakes.

Sewage was treated at the Woodward Avenue Plant where it received primary treatment only. An expansion program - financied by the Province - was underway to provide secondary treatment for average design flows of up to 60 MIGD. The major steel industries treated all their sewage separately. Their effluent which was discharged to the Hamilton Harbour, met the Regulatory Agency's requirements.

After: No major changes have taken place in the collection system. Sewer construction has been continued to meet new development's requirements. Sewer separation for the

combined sewer system is not a specific program for the Region, but it is carried out with redevelopment and/or road reconstruction. Due to the fact that a great majority of the sewers in the City of Hamilton are of the combined type, the Region has used its option under Bill 155 to take over from the City all storm sewers in addition to the sanitary and combined sewer systems.

The sewage treatment system has undergone a major extension and upgrading with the addition of secondary treatment facilities. The plant additions are now fully operated by the Regional staff, and, barring intermittent plant upsets, the plant effluent meets MOE requirements.

Separate treatment by the major steel industries of the majority of their waste water still continues, and their treatment also meets MOE discharge requirements.

(vi) Town of Stoney Creek

Before: Prior to Regional assumption of services, the sewerage systems in the old Town of Stoney Creek and the Township of Saltfleet were connected to the City of Hamilton system. Under these circumstances, the Area Municipalities had to accept the City's conditions for contractual arrangments.

In general, the built-up areas below the escarpment west of De Witt Road were serviced by sewers. A small area of some 75 homes in the Gardendale Survey in the Winona area was - and still is - serviced by a privately owned lagoon. The remainder is served by septic tanks. Discussion had taken place between the Province and the Township to replace the Winona system with a small package plant, but no firm decision was made at that time.

After: Little has changed in the sewerage system in the Town of Stoney Creek since the original system was already set up in an "across the boundary" service. However, in the Winona area, the Region has determined that the sewage should be brought to the existing sewer system west of De Witt Road for transportation to the Woodward Avenue Treatment Plant. In an attempt to satisfy all Regulatory Agencies involved, as well as meeting Area and Regional requirements, the Town and Region have prepared a proposed development plan for Provincial (and Regional) approval. At present, this matter is still outstanding.

Industries in the Town of Stoney Creek which are discharging their waste water into the sewerage system are not causing problems at the Treatment Plant.

4. Responsibility

Prior to the Region's formation, the responsibility for sewage collection was solely vested in the local municipalities who carried out all sewer construction, maintenance and repairs. Sewage treatment, on the other hand, was performed by various levels of government as noted before, i.e. the City of Hamilton Plant was owned and operated by the City but was being enlarged by the Province; the Dundas plant was owned and operated by the Town of Dundas but it required modernization and enlargement for which local funds were not readily available; and the Waterdown Plant was owned and operated by the MOE. Quality standards for the level of treatment were - and still are - under the jurisdiction of the MOE, who set the discharge standard for any and all effluents to public waters.

5. Financing

(a) All new sewerage construction works are subject to the following subsidies from senior governments:

(i) Federal Government: CMHC subsidy under the National Housing Act.

Eligible projects usually include construction or expansion of treatment facilities; construction of sanitary trunk collection sewers; and development of regional sewerage plans. For eligible projects, the subsidy generally represents one sixth (1/6) of the project costs including construction, land cost for treatment plants and pumping stations, and design, construction supervision and legal costs.

ii) Provincial Government: Grants for sewage facilities.

Eligible projects include treatment facilities, intercepting and trunk sanitary sewers and ancillary structures. Costs subject to a grant are similar to those included under the Federal (CMHC) subsidy and the grant generally represents 15 percent of the approved project costs.

(b) All Regional funds for sanitary sewerage works including capital costs for treatment plants and trunk sewers, operations and maintenance cost, and debt charges, are recovered through revenue received as a surcharge on the water rate. At present, this surcharge is set at 100% of the water rate, but under bylaw 2-75, this rate can, from time to time, be reviewed and adjusted by the Council of the Regional Municipality. No property taxes are used for financing sewerage works with the exception of payment for local improvements, i.e. construction of local sewers is being financed by a levy against the properties on a charge-per-foot-frontage basis. Once the local improvement payments have been made, no further general taxes are used and revenue out of the sewer surcharge covers all other sewerage costs of the Region.

6. Summary

In summary, the following points represent the major items in relation to sewage collection and treatment which have occurred since the formation of the Regional Corporation:

(i) The Region has been able to plan its system improvements on a Regional basis, across the Area Municipal boundaries. The collection systems (trunk sewers) are currently being expanded on this basis and appropriate provisions are being made at the treatment centres to provide for the expected flows.

(ii) Regional maintenance crews have been formed to perform all sewer repairs and preventive maintenance.

(iii) Complaints by local tax payers must now all be directed to the Regional offices rather than to the Area Engineering Departments or their representatives.

(iv) Increased level of treatment at the plants has been enforced by the Province just at the time when the Region was formed. Additional costs for labour, power, chemicals, debt charges, etc. have been borne by the Region.

(v) Ancaster has received a complete sewage collection system for its built-up area, with treatment being provided outside the Area Municipality.

(vi) The treatment plant in the Town of Dundas is currently being expanded, for which the Region is carrying the financial responsibility.

(vii) The Township of Flamborough will have two more subdivisions in the Waterdown area approved, due to the expansion of the Waterdown Treatment Plant which is financed by the Region.

(viii) Trunk sewers are approaching the boundaries of the Township of Glanbrook, which will allow sewer service to start in that Township in due course.

(ix) Major expansions at the City of Hamilton treatment plant, which were being undertaken by the Province, are now operated by the Region, and all financial responsibilities including operations, maintenance and debt charges have been assumed by the Region.

(x) A combined Regional-Area plan for the Winona area in the Town of Stoney Creek is being developed to provide improved sewerage service to this area.

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SOLID WASTE MANAGEMENT

SECTION 5

1. Introduction

Until the 1970's, problems of solid waste management received little interest compared to that which had been afforded the supply of water and the treatment of sewage for several decades. As a result, the disposal of solid wastes was a low priority item in most municipalities. Funds allocated to the operation of disposal systems were relatively small and were often simply part of the budgets for road maintenance.

In the late 1960's and early 70's the problems of the throw-away society suddenly surfaced; waste quantities burgeoned and the public, as well as the senior government control agencies, began to express concern over the vast quantities of solid waste and the pollution that was being caused by improper disposal practices.

The individual municipalities which formed the Area Municipalities of Hamilton-Wentworth were, for the most part, disposing of waste in the traditional manner by dumping (and possibly burning) in areas which had generally been selected because they were of little value for other purposes. With the exception of one or two sites, disposal areas did not comply with the standards set by the Ministry of the Environment.

In an attempt to reduce the quantities of waste for disposal, the City of Hamilton constructed the Solid Waste Reduction Unit (SWARU) in the early 1970's, however, it was fraught with many problems and has yet to make an appreciable impact on waste reduction in the City.

The management of solid waste consists of three basic elements:

(a) storage, generally on private property
(b) collection by Municipal, Municipal Contractors, and/or private haulers, and
(c) processing, reduction and final disposal at a land fill site.

With very few exceptions, which are yet to be proven in Municipal application, all methods of reclamation, processing, or incineration result in a residue which must eventually be buried on the land.

Under Bill 155, the Regional Corporation assumed the responsibility for providing and operating facilities for the receiving, dumping, and disposal of solid wastes. By definition, solid wastes were to include ashes, garbage, refuse, domestic waste, industrial solid waste and municipal waste. The Corporation was to assume facilities of the Area Municipalities which were required for these purposes, and was to accept the debts related thereto.

The Regional Corporation did not assume any responsibility for collection or for the direct control of storage. Collection remained within the jurisdiction of the Area Municipalities and storage remained a private concern, although control with respect to health and fire hazards do fall under the jurisdiction of the Health and Fire Departments.

Figure 3 shows the location of the solid waste disposal facilities that were in operation prior to 1974, those which have since been removed from service and those which are temporary. No new facilities have been added.

Since the Region assumed its role in solid waste management, the bulk of the waste generated has been directed to SWARU, and to two sanitary land fill sites; one on Upper Ottawa Street in Hamilton, and the other at Jerseyville in Ancaster. The only other Area site still accepting municipal waste is the Beverley Site in Flamborough, and it is scheduled to close this year.

The remainder of the 10 original disposal sites have been completely closed or remain open on a restricted basis to serve residents wishing to deliver wastes themselves.

Tree wastes and combustible construction wastes are accepted only at the Upper Ottawa Street Site where they are burned. Inert materials such as masonry demolition wastes and excess excavated materials are not accepted at any Regional site.

2. Legislation

(a) Act to Establish the Regional Municipality of Hamilton-Wentworth - Bill 155

The Act defines the responsibilities of the Regional Corporation for solid waste disposal as follows:

The Regional Corporation:

- shall as of January 1, 1974 provide facilities for the purpose of receiving, dumping and disposing of solid wastes.
- may acquire lands within the Regional Area for the purpose of waste disposal and may erect, maintain and operate facilities therefore.
- may contract for such purposes and may regulate and prohibit disposal of certain classes of material at Regional facilities.
- may charge disposal fees.
- shall assume debts for property assumed from the Area Municipalities.

No Area Municipality shall provide disposal facilities.

(b) General Acts

(i) The Municipal Act

Under Section 354 of the Act, land for solid waste disposal cannot be acquired in an Area Municipality without

the consent of that Municipality. Should the Regional Corporation fail to obtain consent or agreement from the Area Municipality, approval may be granted through application to the Municipal Board for such takings. Before granting approval, the Board will hold a public meeting and in granting approval, it may impose restrictions, limitations and conditions relative to the acquisition, and may order ammendments to the Official Plan and/or By-Laws.

Under Section 76 of the Act, a Corporation may borrow money by debenture for waste collection and disposal facilities and may levy costs against rateable property in the Municipality for collection, removal and disposal of solid waste.

(ii) The Environmental Protection Act

The Act was proclaimed to protect and conserve the natural environment and in essence it prohibits the discharge of any contaminant into the natural environment. Contaminants includes any solid liquid or gas which may: impair the quality of the natural environment, cause damage to property, plant or animal life, harm or materially discomfort any person, adversely affect health or impair safety or render property, plant or animal life unfit for use by man. The natural environment includes land, air, and surface and ground water.

With specific reference to solid waste, the Act prohibits the operation, establishment, alteration, enlargement or extension of any system or disposal site without a Certificate of Approval from the Ministry. Passing of By-Laws relative to such works is prohibited until a Certificate has been obtained.

Persuant to an application, the Director may elect to hold a public hearing and may instruct the Environmental Assessment Board to conduct it under the Environmental Assessment Act.

Regulations made under the Act define desirable quality criteria for the natural environment, designate waste types, and set standards for waste management systems and the location, maintenance and operation of disposal sites. The Act also provides provincial officers to investigate and inspect disposal facilities, and to enforce the Act.

(iii) The Environmental Assessment Act

The Act was passed in 1975 for the purpose of "the betterment of the people of the whole or any part of Ontario by providing for the protection, conservation and wise management in Ontario of the environment". Its scope is relatively unique in that the definition of environment includes "the social, economic and cultural conditions that influence the life of man or a community".

The Minister may deem a Municipal project to be within the terms of this Act, in which case the Municipality will be obliged to submit a formal environmental assessment of the undertaking. Such assessment is to consist of: a description of the purpose of the undertaking, a description and statement of the rationale for the project including possible alternatives, a description of the natural environment and the effects that the project will have on it, and actions that may be necessary to mitigate the effects. The Minister may or may not choose to convene a public hearing under the Environmental Assessment Board relative to the project.

The Minister has the power to exempt an undertaking from the application of the Act should he believe it to be in the public interest.

(c) Other Legislation

(i) Public Health Act

The storage or deposit of waste in such a manner as may be dangerous to public health is considered to be a nuisance as defined under the Act. The Medical Officer of Health has the power to take whatever action is required to protect the public safety and health.

(ii) Labour Relations Act

As noted in previous Sections, this Act governs the rights of employees relative to unions, collective bargaining, strikes, lock-outs, etc.

(iii) Industrial Safety Act

The Act requires that a Municipality submit plans for proposed works, such as waste transfer stations, for review by the Ministry of Labour. It also deals with the requirements of employers to provide safe working conditions for workmen employed in such facilities.

(d) Regional Municipality of Hamilton-Wentworth - By-Law

A By-Law is currently being drafted by the Region.

3. General Description

The collection and disposal of solid waste is a split responsibility within the Region, the first being vested in the Area Municipality and the second in the Regional Corporation.

(a) Collection

The responsibility for collecting solid waste is essentially the same now as it was prior to 1974, albeit that amalgamation of some municipalities has altered the jurisdiction somewhat. Each Municipality has enacted By-Laws which define the scope of the collection services and deal with allocation of costs. The actual details of the service provided by each Area Municipality are described later in this Section.

Generally, it would appear that cost of collection has not been severely affected by the Regional assumption of disposal services. Some sites have been closed with the result that certain Area Municipalities are obliged to haul wastes further than had been their previous practice; however, since many sites were clearly unacceptable in terms of Ministry of the Environment standards, closure cannot be considered a direct result of Regional assumption. The haul distances involved are not unreasonable relative to those experienced by many other municipalities in Ontario.

The residents of all urban and most rural areas are provided with weekly collection services. Rural residents in Flamborough, (where lot sizes exceed five acres) may elect to be included or excluded. Only in Ancaster are rural residents obliged to make individual arrangements for collection by a private hauler. In this regard, the Town has recently circulated a questionnaire to sub-urban dwellers to establish whether the municipal refuse collection area should be extended.

(b) Disposal

(i) Current Situation

Prior to 1974 each Municipality provided its own disposal operation which for the most part failed to comply with Ministry standards. These unsatisfactory situations were generally allowed to prevail for the simple reason that an

alternative did not exist. It was well recognized that the acquisition of a new sanitary landfill site was a time consuming, expensive and painful procedure which was beyond the means of the smaller communities.

Of the 10 land disposal sites operating prior to 1974, only three are still accepting municipal refuse. Of these, one small one in the Township of Flamborough will close shortly. Five small sites are still maintained on a restricted operating basis for private use only by local residents. Reference is made to Figure 3 at the end of this report for an appreciation of the original and current disposal sites.

SWARU, the $8.8 million waste incinerator which was constructed by the City of Hamilton several years ago, is still plagued with problems that have prevented it from reaching its rated capacity of 600 tons per day. The maximum throughput to date has been 330 tons per day; at the current processing rate it is reported that unit costs are in the order of $45.00 per ton. It is further suggested that a practical capacity for the facility would be 450 tons per day which should result in processing costs of about $16.00 per ton (after modifications). The Region has spent upwards of $500,000, plus a Provincial grant of $300,000, to modify the facility.

Two major landfill sites now receive the bulk of the Regional waste; the Jerseyville site in Ancaster, and the Upper Ottawa Street site in Hamilton. The former is considered by the Ministry of the Environment to be the only acceptable landfilling operation in the Region, however, at the present rate, it will be full in two years. The Hamilton site continues to receive considerable quantities of waste although it has been virtually full for some time. Lacking an alternative, the Region has simply expanded the site in the vertical direction.

This site has also been designated for the disposal of combustible tree and construction wastes; these are burned in an effort to reduce quantities for disposal.

A system of uniform rates has been established for all disposal sites.

Disposal facilities for liquid industrial wastes are provided by a private concern in Hamilton. Liquids are stored in lagoons which when full, are analyzed, and treated with appropriate chemicals to form solid residues. The latter are landfilled at the Upper Ottawa Street Site. A second private facility in Hamilton accepted and processed combustible liquid wastes in the recent past. The burning operation has now ceased as a result of frequent air pollution problems. It is reported that the storage lagoon at that site is currently used as a liquid transfer station from which the wastes are hauled to the Ottawa Street Site.

(ii) Proposed Scheme

Recognizing that land disposal facilities are virtually exhausted, the Region has initiated action to acquire property for a large sanitary landfill site in Glanbrook Township. Initial steps have been taken to purchase the site and to prepare a design relative to obtaining a Certificate of Approval from the Ministry of the Environment. A public hearing will be held early in 1978 and unless the Township willingly agrees to the use of the land, an Ontario Municipal Board hearing will also be required. Subsequent to these procedings certain development work must be carried out to prepare the site for operation. Under the 1977 Capital Budget, $1.9 million has been designated for the acquisition of the site in 1977, and $2.0 million for development in 1978-1979.

It is obvious that at best, waste cannot be accepted at the Glanbrook site for at least two years.

Assuming that the Glanbrook site is acquired and placed into operation as planned, all other land disposal sites will be closed as soon as possible. Although it may appear impractical to confine disposal operations to a single site in the extreme south-east corner of the Region, the concept is sound. One strong argument for the single site concept is the reduction to an absolute minimum of the expense, delay, and political and public upheaval associated with the acquisition of a site. The largest site that can possibly be justified should be acquired to provide a long-term facility, and from an operating standpoint, the unit cost per ton decreases considerably as the size of the disposal process increases.

It may be argued that several small sites are more convenient but it does not necessarily follow that suitable sites could be found at convenient locations throughout the Region even if they were desirable. The flat, poorly drained nature of Flamborough Township for instance would likely make a good landfill site very difficult to find.

In order to conveniently utilize a single site, it is necessary to make use of transfer stations where collection vehicles can discharge waste within a reasonable distance of the refuse generation areas. Refuse received at these stations is then placed into high capacity transfer trucks which can carry the refuse from three or four collection vehicles to the disposal site. When long haul distances are involved (usually in excess of 10 or 12 miles) the cost of the transfer station can usually be recovered in terms of reduced operating expenses for collection vehicles. The convenience factor for collection crews of the Area Municipalities is also an important consideration.

Consistent with the foregoing, the Region plans to operate three transfer stations plus SWARU in conjunction with the Glanbrook site. Stations would be located at the existing Upper Ottawa Street site, at the SWARU site and near the sewage treatment plant in Dundas. The facility near SWARU would provide both overload and standby capability for the waste reduction plant, as well as accepting certain wastes which are not compatible with the incinerator unit. The 1977 Capital Budget indicates an allocation of $9.5 million for the purpose of developing the transfer facilities.

Seeking an economical alternative to the operation of disposal facilities by Municipal employees, the Region invited proposal-tenders from private concerns in 1976, to provide and operate a complete solid waste disposal system. The terms of reference stated that the successful tenderer would be required to undertake certain obligations, namely to:

- Acquire, establish and operate 3 transfer stations on lands to be leased from the Region.
- Lease, assume control, modify as necessary and operate SWARU at a guaranteed annual tonnage.
- Undertake feasible resource recovery operations.
- Operate facilities 6 days per week, 8:00 a.m. to 6:00 p.m.
- Dispose of snow collected from the roads within the Region.
- Dispose of special wastes - construction debris, excavated material, demolition material.

In February, 1977, seven submissions were received from five firms; estimated total annual costs varied from $7.9 million to $11.3 million (with adjustments for added Regional costs to bring all tenders to an equal basis and provide a total system). The low tender complied with

most of the Region's conditions except those relative to providing snow and special wastes disposal. The system proposed would reportedly be capable of handling 660,000 tons of refuse per year; 120,000 at SWARU and 540,000 at the transfer stations. The overall unit cost for that quantity would be approximately $12.00 per ton.

For comparison with the tendered price, the current annual cost for refuse disposal is $4.1 million. The evaluation report prepared by the Solid Waste Management Steering Committee, suggests that since considerable haul-cost savings will accrue to those using the new facilities, and since about 80 percent of the waste is hauled by private commercial operators, then rates for disposal should be increased to offset the proposed new costs.

The submission by the low bidder has been accepted in principle, and it now remains for the details of an agreement to be developed. The first phase of the program will be the assumption of SWARU early in 1978; the contractor will have six months to make modifications and place the facility on-line. Other elements of the system would be assumed by the contractor as soon as possible, consistent with approvals by the appropriate Provincial bodies, and construction of facilities. The objective is to place the entire system into full operation by 1979.

Although the system proposed does not deal with the problem of excess excavation disposal, the Engineering Department has pursued this problem and reports that three private operators have shown interest in accepting inert wastes.

(c) Practice of Individual Area Municipalities

(i) The Town of Ancaster

The current collection practice in Ancaster provides once per week service to the residential and commercial establishments within the urban area. The cost of the municipal contract is charged against the general tax rate. Rural areas are not included in the scheme at present and must make private arrangements for pick-up.

Waste is taken to the expanded Jerseyville Site which was the Ancaster disposal facility prior to Regional assumption. The site is considered by the Ministry of the Environment to be the only acceptable one in the Region; at the present rate, however, it will be filled within two years.

To date the change in responsibility for disposal has had little impact on Ancaster except that they have been relieved of the burden of operating the site. Once the new waste disposal system is initiated, the Town will be obliged to haul waste to the proposed transfer station in Dundas. Since the distance from the center of the waste generation area is about the same in either case, the change should have little impact on haulage costs.

(ii) The Town of Dundas

Dundas uses two municipal crews to collect waste from the entire Town. Residential waste is picked up once per week and commercial, twice per week. With the exception of a 100-unit apartment building which employs a private contractor, municipal forces serve all establishments. Costs are assessed on the general taxation bill.

Prior to 1974, Dundas maintained two small, adjacent sites which they believe could have served the Town for at least three more years. Once the sites were assumed by the Region, the quantities were increased and the sites were quickly filled. The Town is now faced with travelling considerably further to deposit waste at the Jerseyville Site.

To offset the additional haulage cost, the collection crews have been reduced from three to two men. Town staff do not feel that this has adversely affected the quality of service to the residents. The closing of the local sites does, however, create an inconvenience for individuals who wish to dispose of wastes themselves. They must now travel a greater distance to Jerseyville; further, should they wish to dispose of tree wastes they must go to the Upper Ottawa Street Site in Hamilton.

Once the new disposal system is initiated, a transfer station will be constructed near the sewage treatment plant in Dundas. This will likely make the disposal of Town wastes even more convenient than was the case before 1974.

(ii) The Township of Flamborough

Prior to 1974, the four municipalities which now form the Township each had individual systems for solid waste collection and disposal. The Village of Waterdown provided a municipal collection service under contract with a private hauler. The Townships relied on private arrangements for the most part. Both Waterdown and East Flamborough used the Burlington site for disposal; West Flamborough and Beverley Townships operated their own sites.

The Township now provides collection to all residents by means of a contract with a private operator; the unit rate is $15.44 per year. Residents with properties of more than five acres may elect to be in or out of the system. Collection is once per week; apartments twice per week at no extra cost.

The Region has closed the West Flamborough site which was really just a swamp. The Beverley site still operates and accepts all Township wastes. It is, however, scheduled to close this year, after which the Township will use the Jerseyville site. This will involve a considerable increase in the haulage distance. The Township had the foresight to ask for alternate prices to use the Jerseyville site when the service was tendered; the alternate of $17.88 is quite reasonable. Once the new disposal system is initiated, Flamborough wastes will be delivered to the transfer station in Dundas.

(iii) The Township of Glanbrook

Solid waste from all residential units within the area is collected once per week through municipal contract with a private operator; the current cost is $24.60 per unit. The contractor does not service commercial establishments; they are obliged to make private arrangements. Prior to 1974, all collection was on a private basis.

Before Regional assumption of disposal facilities, the two municipalities which now compose Glanbrook, operated their own sites, the Binbrook Site and the Chippewa Site. Both were reportedly plagued with complaints from the Ministry of the Environment relative to non-compliance with Provincial regulations. Even prior to 1974, private haulers used the City site at Upper Ottawa Street. All municipal waste must be taken to that site now, but the

two local sites have been retained and are operated by the Region to serve private individuals. The change to Regional disposal has therefore caused no inconvenience and has relieved the Area Municipality of the nuisance associated with operating their own sites.

The Regional Corporation has recently taken steps to acquire a 500 acre site in the south-east corner of Glanbrook to serve as the sole sanitary landfill for the Region. The Council and residents of the Township are most displeased at the prospect of the proposed facility in Glanbrook and the recent draft Official Plan indicates formal objection to the site.

(v) The City of Hamilton

Collection of City waste is carried out under the control of the Streets and Sanitation Department, as it was prior to 1974. Municipal refuse is collected once per week by City crews although about half the vehicles and drivers used are rented. All residential units including about 90 percent of the apartments are served. Commercial establishments also receive service, providing they limit their weekly refuse to 15 standard containers. It is estimated that the City crews pick up about 130,000 tons per year or approximately 25 percent of the total. The cost of collection is reported to be $15.32 per ton.

Prior to 1974, the City operated three landfill sites: the West-End site, the Brampton Street Site and the Upper Ottawa Street site. Although the City operation of the landfill sites was accepted by the Ministry of the Environment, it was apparent that control was becoming more stringent and would cause difficulties. The SWARU had just been completed and was still experiencing start-up problems.

After the Region assumed the disposal facilities, the West-End and Brampton Street Sites were closed and rehabilitated. The Upper Ottawa Site is now the major disposal facility in the Region and is greatly overtaxed. Closure should have been effected some years ago.

Once the new disposal-transfer scheme is operating, the City will have the option of delivering wastes to three transfer stations plus SWARU. This should reduce their overall travel time and accordingly, the cost of collection. City personnel responsible for solid waste are quite pleased that they have been able to divest themselves of the problems associated with disposal facilities.

(vi) The Town of Stoney Creek

Collection throughout the Town is provided by Municipal Contract, with once per week service to residential as well as commercial customers; restrictions are placed on the latter.

Prior to 1974, refuse was taken to a local municipal site which is still operated by the Region for the convenience and use by private individuals only. Municipal wastes are now collected under contract and are taken to SWARU or the Upper Ottawa Street Site.

4. Responsibility for Policy and Financing

(a) Storage

The policies relative to storage and accumulation of waste on private property are regulatory ones established under the Public Health Act and the Regional Fire Department. The Medical Officer of Health and representatives of the Fire Department may enter private property to inspect

storage conditions and take appropriate actions where they believe a danger to public health or safety exists. In the true sense of physical services, these departments do not fall within the scope of this review.

(b) Collection

Collection is purely an Area Municipality function with the Region exercising no control over policy with the exception of the interface which exists in terms of location, hours of operation and acceptable waste constraints imposed at the disposal and processing sites.

The current policies relative to collection appear to have changed very little during the period that the Regional Corporation has existed. Individual programs have been combined in some cases where amalgamation of municipalities has occurred, and certain areas have shifted from one Municipality to another where lands have been annexed. In most instances, new collection By-laws have been enacted to accommodate these changes in the scope.

Only two of the Municipalities collect refuse with municipal forces, Hamilton and Dundas. All others have awarded municipal collection contracts to private operators. These operators are allowed to discharge municipal waste at the Regional sites at no charge. In Hamilton, the responsibility for collection lies with the Department of Streets and Sanitation; the Department is answerable to City Council. The Dundas system is under the direction of the Works Superintendent. Where collection is carried out by contract, the administration of such is normally through the appropriate engineering or works department. In the case of the more rural communities, the roads superintendent may oversee the operation and ensure that the contractors respond to citizen's complaints.

Policies as to the extent or quality of collection services have for the most part been developed prior to the formation of the Region. Except for rural areas of Ancaster, all residents within the Region are entitled to collection services. As noted previously, the citizens of the suburban area of Ancaster are currently being questioned to determine whether collection services should be extended.

(c) Disposal

Prior to 1974 the disposal practices of some local municipalities consisted of dumping in sites which could not meet the criteria set by the Ministry of the Environment. The costs involved in such systems were low and rarely reflected truely representative values for the operation of acceptable disposal facilities. It is not surprising however that such conditions persisted, in light of the cost and difficulties associated with the acquisition of new sites. It should be noted that the Ancaster site is the only one that currently meets the intent of the Provincial regulations.

The responsibility for planning and operating disposal facilities to accommodate snow and refuse derived from construction and demolition activities as well as conventional domestic and commercial wastes, rests with the Environmental Services Section of the Department of Engineering. The facilities assumed by the Department in 1974 included few elements that could be considered of more than of temporary value. The one exception was SWARU and that was experiencing operating problems to the extent that it was a questionable asset to the disposal system. The responsibility placed upon the Region to provide an acceptable management system was one that most Area Municipalities seem content to be rid of. As such, there is little likelihood that the loss of direct (non-

political) control has been of any concern to them. The Township of Glanbrook which currently appears to be the likely recipient of all refuse from the Region, has a somewhat different view; this is a natural reaction which would probably be shared by any other municipality had the site been selected elsewhere.

As early as 1974, the City of Hamilton and the County of Wentworth, assisted by the Ministry of the Environment, had taken steps to initiate development of a comprehensive solid waste management system and had engaged consulting engineers to carry out a study of the Hamilton-Wentworth area. Completion of the study was delayed with the pending formation of the Regional Corporation and it was eventually completed under Regional sponsorship in March, 1976. The Report recommended the concept of the Glanbrook Site supported by transfer stations and SWARU and formed the basis for the terms of reference relative to requests for proposal-tenders previously discussed.

In light of the problems that had been experienced with SWARU, a study of the facility was commissioned by the Ministry of the Environment and a report dealing with recommended modifications was subsequently submitted. These recommendations have also been considered in setting the terms of reference for the contracting of disposal services.

The policy to transfer the operations to a private contractor has been developed by the Regional Government, however prior to full initiation of the system, approvals must be obtained from the Province as follows:

Ministry of the Environment

Under the provisions of the Environmental Protection Act the Municipality must obtain a Certificate of Approval

from the Ministry to develop the various elements of the disposal system. The Region has already initiated procedures relative to the Glanbrook site, however, approval must also be obtained for each transfer facility. A hearing to apprise the public of the proposal and to enlist their opinions and objections will be required.

Subsequent to approval and eventual commissioning of facilities, the Ministry will exercise control of the operations through enforcement of Regulations made under the Act.

Environmental Assessment Board

Under the terms of the Environmental Assessment Act, the Municipality could be obliged to prepare and submit a formal environmental assessment for the proposed disposal facilities. The Minister of the Environment may choose to make parts, or the entire project, exempt from the application of this Act should it be in the public interest so to do. However, it is quite likely that certain elements of the system will be subject to the terms of the Act. The Minister may require that a public hearing be held by the Environmental Assessment Board in which case, the hearing under the Environmental Protection Act would not be required as well.

The Municipal Act

Under Section 354 of the Act, the Regional Corporation cannot take lands of an Area Municipality for waste disposal without the consent of that Municipality. Should the Region be unable to negotiate with the affected municipalities and obtain their consent, then application must be made to the Ontario Municipal Board to take the lands and make appropriate changes to Official Plans. The Board will conduct a public hearing to hear the views of individuals, groups, and the Area Municipalities.

Except for routine political representation through local members on Regional Council and Committees of Council, the Area Municipalities and individuals can affect waste disposal only through the opportunities provided under the aforementioned Acts. These procedures have been established to protect the public as well as the natural environment, and public representations are given due consideration by the Boards.

5. Financing

The cost of providing the solid waste disposal service is borne by the Regional taxpayers through equalized assessment. The latter is arrived at by means of a Provincial formula which eliminates disparity between the various areas and reduces all assessment to a common base. A detailed discussion of costs may be found in Section 2.

Collection costs incurred at the Area Municipalities level are included in the tax billings of all those who receive the collection service.

With the exception of special assistance which may be provided for specific reclamation programmes, the only funds available for solid waste management are those provided by the Ministry of the Environment for area planning studies. A grant is provided under the Environmental Protection Act which covers 50 percent of such waste management study costs.

6. Summary

There is little doubt that the responsibility for waste disposal must be vested in the senior level of Regional Government; in fact, opinions have been expressed that it should be elevated further to the Provincial level. Operation of disposal facilities at a local level is not viable in terms of economics or environmental protection. From a practical standpoint, not all Area Municipalities

necessarily include land suitable for disposal using sanitary-landfill techniques. In terms of the cost and procedures to obtain new sites, it would be prohibitive and impractical for each local municipality to proceed alone.

The system of transfer stations and a single landfill site proposed by the Region is sound. The contracting of these operations to a private operator will relieve the Region of certain direct expense, but the costs for disposal as reported will be considerably higher than at present.

On the surface, this increase may appear to be excessive, however, it would be erroneous to compare the cost of the current system, which fails to meet the Provincial standards for waste disposal, with the new scheme which will. Establishment of the transfer facilities is a major factor in the total cost, however, these are absolutely necessary to control the cost of collection as well as providing convenience. As has been suggested by the Solid Waste Management Steering Committee, the new facilities will result in considerable cost reduction for private haulers. Since they represent a major contribution to the waste disposal requirements, it would not be unreasonable to raise private tipping rates to at least partially cover the higher system costs.

As to collection, there seems to be a good traditional background for these services to be provided at the local level. They do not represent any particular hardship for the Area Municipality and would not be enhanced by an increased scale of operation as is the case for disposal. Further, private contracting for such services is quite competitive at the local level, and results in reasonable costs. Should the scope be expanded, many small contractors would likely be eliminated from competing and costs could very well rise. The element of local responsibility and customer satisfaction also suggests the current arrangement is preferable. Waste collection involves far more contact with the public than does, say sewer maintenance; as such the local level of service seems preferable.

The major problem relative to solid waste management in the Hamilton -Wentworth Region, and in many others, is that associated with obtaining landfill sites;, the cost is high and the time required seems unreasonably long. It is ironic that disposal in sites that are totally unacceptable under Provincial Regulations must persist because of the long delays which are imposed to a considerable degree by the procedures established under Provincial Acts.

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STORM WATER MANAGEMENT

SECTION 6

1. Introduction

With the formation of the Regional Municipality of Hamilton-Wentworth in 1974, the Region assumed responsibility for the drainage of stormwater from Regional roads and surrounding lands which naturally drained into these systems. The Area Municipalities continued to operate and maintain all remaining drainage systems within their boundaries including storm sewers, ditches and culverts on local roads; however, the Regional Corporation was empowered to assume through By-Law all or any portion of the land drainage systems of the Area Municipalities. Due to the prevalence of combined sewers in the City of Hamilton, the Region has taken over all existing sewers within this municipality. With this exception, planning and administration of drainage works remains essentially unchanged by the formation of the Region.

Local drainage systems which are evident in the Area Municipalities primarily reflect the period of major system construction and the degree of urbanization. In the City of Hamilton, the system framework was established during the early twentieth century hence these areas with minor exception are serviced by combined sewers. Within the remaining municipalities, storm sewers and roadside ditches constitute a separate system which provides local drainage.

While stormwater runoff from the urban areas of the Region is discharged to local watercourses, major topographic features effectively divide the drainage courses into three distinct zones. Within the municipalities of Flamborough, Ancaster, Dundas and Hamilton, major receiving streams such as Spencer and Redhill Creeks ultimately flow into Hamilton Harbour. To the east in the Town of

Stoney Creek, numerous open watercourses discharge directly to Lake Ontario while above the escarpment Twenty Mile Creek and the Welland River drain the agricultural lands both within the Town and the Township of Glanbrook. These latter streams flow eastward into the Regional Municipality of Niagara before draining to Lake Ontario and the Niagara River.

2. Legislation

(a) The Regional Municipality of Hamilton-Wentworth Act

The responsibilities of the Regional Corporation in providing an adequate system of land drainage with respect to regional roads and surrounding lands is defined in the Regional Municipality of Hamilton-Wentworth Act, Bill 155, Revised Statutes of Ontario 1973. Provision is made for the Corporation to undertake drainage programs including storm sewers within the Area Municipalities as necessary and to assume all or any portion of the land drainage systems of an Area Municipality without compensation. In addition, the Region may enter into agreements with adjoining Regional Corporations for the purpose of receiviing and disposing of land drainage.

Under the Act, the Area Municipalities are responsible for all other land drainage systems including storm sewers within their boundaries. Procedures for the financing of drainage systems initiated by the Regional Corporation and thereafter charged to the Area Municipality are detailed including such measures as payment from general funds, imposition of sewer rates or the levy of service charge within a designated urban service area.

In addition to these powers, the Corporation approves the connection of local drainage systems to Regional works and may establish through By-Laws standards for the design and maintenance of these local systems.

(b) The Conservation Authorities Act, 1973

This Act defines the responsibilities of a Conservation Authority in conserving the natural resources within the physical boundaries of a watershed. An Authority may be formed with jurisdiction over a watershed, or a group of watersheds upon petition to the Province of Ontario by the majority of municipalities situated within the drainage boundaries.

The Regional Municipality of Hamilton-Wentworth by virtue of its jurisdictional boundaries is located within four Conservation Authorities:

		Watershed	Area Municipality
i)	Grand River Conservation Authority	Grand River	Township of Flamborough Town of Ancaster
ii)	Halton Region Conservation Authority	Twelve Mile Creek Grindstone Creek	Town of Flamborough
iii)	Hamilton Region Conservation Authority	Spencer Creek & Tributaries Redhill Creek Stoney Creek Numerous watercourses tributary to Lake Ontario	Township of Flamborough Town of Dundas Town of Ancaster City of Hamilton Town of Stoney Creek
iv)	Niagara Peninsula Conservation Authority	Welland River Twenty Mile Creek	Township of Glanbrook Town of Ancaster Town of Stoney Creek

Flood control and water conservation has remained one of the important programs of the Authorities and under the provisions of the Act, the Authorities are able to achieve their water management objectives by erecting works and structures thereby controlling the flow of surface waters and flooding. Regulations may be further adopted under the Act to supplement the physical works carried out for flood control purposes. These Regulations serve to prohibit building in an area susceptible to flooding during a regional storm, placing of fill in areas over which the control of flooding or pollution or conservation of land may be affected and altering in any way an existing channel of a watercourse.

Currently, regulations have been adopted for all urban streams within the Hamilton Region Conservation Authority's jurisdiction with drainage areas exceeding one-half square mile. Grindstone Creek, administered by the Halton Region Conservation Authority, remains the only other watercourse with regulations at present under the Conservation Authority Act, however, studies for this purpose have been initiated by the Niagara Peninsula Conservation Authority for the Welland River and Twenty Mile Creek with completion scheduled for 1978.

3. Management

Local drainage has largely been developed in individual systems by the local municipalities before the formation of the Regional Corporation in 1974 and with the exception of the City of Hamilton, continued growth and maintenance of the systems has remained an Area Municipality responsibility. The supervision of drainage works is carried out by the Engineering Staff within the Area Municipalities but in the City of Hamilton facilities are now designed and maintained by the Region with the cost charged to the Municipality. This arrangement in the latter case was largely dictated by the high percentage of combined sewers which are present in the City.

The design of drainage works which form part of urban services within land development schemes are carried out by the proponent, however, final approval must be obtained from Engineering Staff responsible for drainage in the particular municipality as a pre-requisite to the preparation of subdivision agreements. During the preparation of designs, standard guidelines and parameters such as tributary drainage areas are provided to the developer together with permissible connection points to existing sewer systems. Within the City of Hamilton, Municipal Staff input for drainage requirements is now related to the portion of the subdivision agreement dealing with street patterns and design.

Since the Regional Corporation has taken over storm drainage related to Regional roads, sewer costs related to applicable roads in the City of Hamilton are included in the cost of the road and are paid by equalized assessment across the Region. A similar arrangement is in effect within the remaining municipalities although roadside drainage consists primarily of open ditches together with a few local sewers which discharge to natural watercourses. In all cases where a storm sewer is required to serve a Regional road, the design accommodates the natural tributary area and the Area Municipality is assessed the additional cost by the Regional Corporation.

Natural runoff fortunately does not traverse boundaries of the Area Municipalities in a manner which will cause local drainage problems, therefore, working agreements for the purpose of coordinating drainage schemes have not been necessary at a municipal level. Nevertheless, in seeking to resolve potential flooding problems along primary watercourses, cooperation between the Conservation Authorities and the Area Municipalities on a watershed basis has evolved. The provision of provincial grants through the Authority for capital works is of added benefit to the Region and ultimately the benefitting municipalities.

With the continuous spread of urbanization within local watersheds tributary to existing developed areas, increased runoff and streamflows have been experienced on a number of watercourses. This

changing pattern of runoff has caused concern to the Authorities and Area Municipalities regarding the impact of these increased flows. To date, the Conservation Authorities have attempted to either reduce stormwater runoff from new developments to pre-development levels through a number of management measures or control potential erosion by stream protection measures. Present jurisdiction under the provision of the Conservation Authorities Act is limited to regulating the drainage discharged directly to primary watercourses. If a new development is not adjacent to a watercourse, the Authorities comment upon the proposal as part of the Ministry of Housing's review procedure. In this case, approval of drainage schemes with respect to urban impacts and implementation of proper stormwater management measures appears to rest primarily with the Area Municipality.

4. Drainage Systems: Capability and Works Programs

Within the agricultural districts of the Region, roadside drainage ditches discharging to local watercourses remain very much in evidence. Further evolution of the storm drainage system to a point where streams are enclosed and runoff is carried in a network of sewers quite naturally reflects the degree of local urban development.

In the Township of Flamborough, a storm sewer system has been installed in the Village of Waterdown with discharges directed to Grindstone Greek; a recent study has found the system will convey five-year storm flows. Future expansion of local drainage works is to proceed in the western portion of the Village, paralleling the construction of sanitary services as dictated by future growth. Present standards of design are to be maintained at the five-year level for storm sewers with drainage channels sizes to convey 25-year flows.

Jurisdiction over the primary watercourses, Grindstone and Borer's Creek, has been assumed by the Halton Region and Hamilton Region Conservation Authorities respectively with the passage of Flood and

Fill Line Regulations. The Municipality and the Halton Region Conservation Authority have actively worked together to eliminate local erosion on Grindstone Creek resulting from the discharge of storm water; a program to install adequate outlet protection works in storm sewers discharging to the Creek has been particularly successful. Proposals by the Hamilton Region Conservation Authority to limit stormwater discharges to Borer's Creek at pre-development levels are presently under consideration.

The storm drainage system in the Town of Ancaster is presently limited to the former Village with storm sewers designed for two-year flows and ditches or swales providing a 25-year protection level. Design standards for new development including flow quantities and drainage paths are established by the Town and designs are approved by the Municipality with comments often requested from the Hamilton Region Conservation Authority. Larger subdivisions require retention ponds to limit the increased stormwater flows due to urban development with the developer paying all costs for drainage works.

The storm sewer system in the Town of Dundas reportedly is adequate and provides for drainage of five-year flows. Potential flooding problems are anticipated from new developments in which the natural drainage is directed back through the original Town; however, storm sewers are being rebuilt as downtown redevelopment takes place. The Hamilton Region Conservation Authority has been active in regulating stormwater discharges to the major streams from new developments and promoting the use of stormwater detention ponds to control the effect of urbanization on peak storm flows. Potential flooding problems on the Spencer Creek and tributaries have now been recognized and remedial solutions documented through a number of flood control studies; however, design of structural works remains at the conceptual engineering stage. Due to the shallow depths of flooding, a number of landfill schemes within the designated floodplain are under consideration.

In the Town of Stoney Creek, storm drainage is presently provided in the built-up areas to the west of DeWitt Road by a system of com-

bined sewers which are tributary to the Woodward Avenue Sewage Treatment Plant. During 1976, a master drainage plan was completed in cooperation with the Hamilton Region Conservation Authority for those areas east of Fruitland Road which will undergo future development. Local urbanized areas are to be provided with a system of storm sewers designed for the 10-year event; in addition, the multitude of small streams draining to Lake Ontario are to remain as open watercourses but are to be improved to safely convey the 100-year flow from open space lands and the 10-year flow from sewered areas. Due to the presence of major transportation corridors, significant modifications to stream crossings will be required. The loss of stream valley storage is not considered hydrologically significant, therefore, encroachment into the floodplains is to be permitted if development is floodproofed above design flood levels.

The Township of Glanbrook has experienced few urban drainage problems due to the rural nature of the municipality. At present, there are no storm sewers and drainage is provided by roadside ditches and culverts. Flooding of streams is not considered a serious problem, and the control of stream encroachment and filling along the Welland River and Twenty Mile Creek has been successfully carried out by the Township on an ad hoc basis through a Municipal By-Law. More effective administration of hazard lands is anticipated with the completion of flood and fill line regulations under the Conservation Authorities Act during 1978.

The combined sewer system in the City of Hamilton generally provides adequate drainage for the 10 to 15-year events, nevertheless, increasingly greater population densities and urban development have resulted in surcharing of sewers in some areas with the consequent flooding of basements. Engineering studies have been undertaken by the Region for the portion of the system below the escarpment and west of Victoria Street to determine the extent of flooding and the storm relief sewers which will best alleviate the current problems. Where possible, the existing combined system is to be converted to sanitary sewers in parallel with the construction of storm relief sewers.

With the exception of the aeration provided in the upper reaches of the Desjardins Canal, treatment of stormwater runoff is now limited to combined sewage from the City which is intercepted and directed to the Woodward Avenue Sewage Treatment Plant before discharge into Hamilton Bay. Remote control operation of several interceptor overflow regulators is expected to reduce the quantity of untreated stormwater discharges and the Region now plans to proceed with several additional installations. The Region has proposed to treat stormwater by 1981 at two locations tributary to Redhill Creek with treatment consisting of 2 MG settling tanks and chlorination of storm overflows.

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AIR QUALITY CONTROL

SECTION 7

1. General

Air quality control in the Regional Municipality of Hamilton-Wentworth comes under the jurisdiction of the Provincial Government. With enactment of the Air Pollution Control Act in 1967, this responsibility passed from the municipalities to the Province. The Province at that time assumed the operation of monitoring equipment from the few municipalities who were carrying out the air quality control function. The City of Hamilton was one of these.

The 1967 legislation permitted a more uniform approach to the control of air quality and also provided the power necessary to deal with major air pollution offenders.

In the decade since 1967, considerable improvement in air quality has occurred in the Hamilton area, however, there is still a lack of a suitable mechanism in overall planning for air quality control. The Province can be consulted by the municipalities in relation to advice for land use planning but this is not a legal requirement.

2. Legislation and Administration

(a) The Province

Air pollution control in the Province of Ontario is legislated through the Environmental Protection Act, 1971. This the Province to establish standards, to monitor air quality, to carry out an approvals and abatement program and to conduct supporting research. The legislation is implemented through the Ministry of the Environment by means of the

Resources Division and the Regional Operations and Laboratories Division. In 1974, the same year that the Regional Municipality of Hamilton Wentworth was initiated, five Regional offices of the Ministry were created for "the delivery of services". One of these offices, in Stoney Creek, is responsible for the South-Central Area of the Province which includes Hamilton - Wentworth. The Regional Ministry offices look after sampling and enforcement. The Resources Division, in Toronto, sets policy and conducts assessments including approvals of major installations.

The mechanisms used to enforce air pollution control include Regulations, Guidelines and Director's Orders. Regulations are legally enforceable, while Guidelines have no legal connotation unless enforced by Director's Orders. Regulations have been established for more than 100 contaminants and more are added each year. Regulations are also established for certain types of industries e.g. ferrous foundries, asphalt paving plants, etc. The Regulations apply equally to all parts of the Province.

Regulations are sometimes made ineffective because of the micro climate of a particular area. In these cases, the local conditions can be simulated through modelling and specific requirements drawn up for an individual contaminant source. In this instance, Director's Orders are issued to, say, an industry with a time limit for reduction of the offending source.

For new facilities, the Provincial Guidelines must be met or no approval will be given. The Guidelines are subject to appeal through the Environmental Appeal Board and ultimately, the Courts. Efficacy of the Guidelines can be argued whereas Regulations cannot.

Regulations are established through a rather lengthy process of scientific evaluation and scrutiny. An inter-disciplinary committee first studies thoroughly the implications and known effects of a contaminant. The safe levels are set below the known effects level, then an ambient air quality level is established as an objective. The proposed Regulations are then reviewed by an Advisory Council who must concur before

the process continues. If agreement is reached, the Deputy Minister then sets up the Regulations for approval by the Legislature.

The Air Resources Branch acts as a services unit in supplying information where required throughout the Ministry. This includes technical services relating to vehicle emissions, meteorology and air quality, phytotoxicology, criteria development and program planning, and technology development and appraisal.

The vehicle emissions section deals with setting of standards, monitoring of vehicle emissions and liaison activities with other government ministries. The meteorology and air quality section provides meteorological expertise and advice and administers the Air Quality Index in Hamilton. The Index has been measured continuously in Hamilton since 1970 and is based on a 24-hour average concentration of sulphur dioxide and particulates. This section also assists the Regional Office and the Environmental Approvals Branch in predicting air pollution using a variety of models. Some models are made part of the Regulations while other models are used for planning purposes.

The Environmental Approvals Branch of the Environmental Assessment and Planning Division is responsible for environmental approvals including air quality aspects for all new large projects in the Province. Smaller projects may be approved at the regional level in the appropriate Regional Office. The Branch has a Land Use Co-ordination and Special Study Section which reviews on a referral basis a variety of proposals made under The Planning Act, which are referred for approval by the Ministries of Housing and Treasury, Economics and Intergovernmental Affairs. These proposals cover matters such as subdivision plans, condominium plans and zoning. Through this referral mechanism, the Ministry of the Environment can influence decisions affecting zoning and new construction. The Approvals Branch provides planning advice to any new undertaking so that adverse effects will be avoided. This advice is not necessarily heeded and once a decision to proceed with a development receives municipal approval, it is difficult to effect any change on air management grounds.

The West Central Region enforces air pollution control within the Hamilton - Wentworth Region. Within the West Central Region Organization there is a Hamilton regional office that handles municipal and private abatement. Industrial abatement of air pollution is also handled through this office. As part of the technical support activity, air quality is monitored and assessed in Hamilton. Simple approvals are handled by the region office, whereas more complex ones are forwarded to the Approvals Branch.

There is little contact between the municipalities in the Regional Municipality of Hamilton - Wentworth and the Ministry of the Environment regarding air quality. The Ministry monitors air quality throughout the area and has nine continuous monitors that measure sulphur dioxide, the coefficient of haze, oxidants, oxides of nitrogen, oxide, carbonmonoxide and hydrocarbons. The locations of the monitors are shown on Figure 4. In addition, there are numerous discrete sampling monitors that measure particulates, heavy metals, trace substances and long term trends in sulphur dioxide and fluoride emissions.

When informed by the Air Resources Branch that air quality is unacceptable and likely to remain unacceptable for more than a very brief time, regional staff are empowered to:

(i) request curtailment of emissions when the Air Quality Index reading is between 32 and 49;

(ii) order emission curtailment when the Index reading is 50 or more.

(b) Federal

The Federal Government has passed the Clean Air Act, 1971 for the control of air quality in Canada. Federal Regulations for ambient air quality are published in the Canada Gazette. Federal Regulations differ from those of the Province in that they relate to industry types rather than individual contaminants.

Federal activities in Ontario are mainly limited to Federal facilities, works funded by the Federal Government and boundary matters. The Environmental Protection Service (EPS) is the arm of the Department of Fisheries and Environment that has responsibility for air pollution control in the foregoing areas. An Ontario Regional Office of EPS is located in Toronto.

The EPS in Ottawa has established an organization called the Federal Activities Protection Branch to coordinate pollution control for federal facilities and undertakings. Experts within the department evaluate consequences of air emissions and recommend measures so that federal and provincial standards are not exceeded. Liaison in such matters is maintained with the Ontario Region of EPS.

With regard to railways, the Canada Railway Act, administered by the Canadian Transport Commission, gives enforcement of air pollution matters to the Province of Ontario. Therefore, air pollution generated by railways in Hamilton - Wentworth is the responsibility of the provincial Ministry of the Environment. Similarly, air pollution regulations relating to shipping governed by the Canada Shipping Act are enforced by the provincial Ministry of the Environment. Emissions from automobiles are within the jurisdiction of the Province, however the Federal Government is responsible for establishing limits for auto emissions from new vehicles.

3. Implications for Hamilton-Wentworth

(a)

The Province's air pollution control program in Hamilton-Wentworth has centred on the major industries in the City of Hamilton. The steel industries in Hamilton have succeeded in reducing emissions by 38 $\mu g/m^3$ in the period 1970-76. This was achieved at some considerable cost, however, estimated at $72 million. To reduce these industrial emissions by a further 8 $\mu g/m^3$ would cost an additional $80 million according to the West Central Office of the Ministry of Environment

As a result of this major industrial thrust, the major source of air pollution, in Hamilton, now comes from the streets as follows:

Imported	35 percent
City related activities	40 percent
Industrial emissions	22 percent

The only means available to reduce the City-related source would be for the municipal authorities to undertake a street vacuuming program. This could clearly be a requirement of the Regional and Area Municipalities in the future if it is considered desirable to reduce further the overall levels of air pollution in the Region

(b)

At present, there is no mandatory requirement for the municipalities to include air quality as a parameter in determining optimum land use. Thus, developments which require high air quality can be permitted to occur immediately downwind of existing facilities which produce significant air emissions. The emitting facility must then undertake further pollution control measures to reduce these emissions.

Similarly, a facility might have been provided with adequate controls at considerable expense to the owner. An adjacent development, subsequently permitted, could materially affect the suitability of these controls if a high building were constructed and seriously disrupted the facility's air emissions.

These are examples of problems that can be created through the lack of application of available air quality planning tools. Indeed many of today's environmental problems have been caused by improper land use decisions in the past. The Provincial staff has air quality models at its disposal that could be used to good effect in assisting the municipal planners in making land use decisions.

(c)

The Regional Government has no control over emissions from vehicles which are governed by Provincial and Federal legislation. Although more stringent regulations has resulted in lower emissions per vehicle, the numbers of vehicles continue to increase, thus making this a continuing problem. It is apparent that the municipalities should have some voice in transportation control to assist in mounting a total campaign to control the vehicular effects.

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NOISE ABATEMENT

SECTION 8

1. General

Noise control is the responsibility of the Area Municipalities in Hamilton-Wentworth. Each municipality has a By-Law that deals with noise, but most of these are of the type generated under the Ontario Municipal Act and are too narrow in scope to be effective.

The City of Hamilton has recently prepared a draft noise By-Law. A comprehensive study of noise levels in the City of Hamilton was carried out in 1973 and this identified some of the problem areas. These are generally related to locations where there have been long standing conflicts in land use.

Some sources that generate noise are outside the control of the municipalities including provincial highways, railways and aircraft.

2. Legislation

(a) Municipal

In the past, most municipalities have enacted By-Laws relating to noise under the provisions of the Ontario Municipal Act. This is now being replaced by the provisions of the Environmental Protection Act as discussed under 2(b).

(b) Provincial

Sound and vibration are included in the list of contaminants controlled through the Environmental Protection Act, 1971. The amend-

ment of Section 95 of the Act passed in October 1975 permits local municipalities to pass By-Laws for noise abatement purposes within their boundaries. The Ministry of the Environment has also prepared a model By-Law for municipalities which contains the provisions for establishing, regulating and enforcing a program of noise control at the local level. The administration of the By-Law is then carried out by municipal staff.

The new legislation provides the scope necessary to deal with a broad range of noise problems of a local community nature. The Province will update the model municipal By-Law as necessary in future to incorporate technological advances or to broaden the scope of the supporting publications. It is noted that the legislation specifically excludes the Regional Government from involvement in noise control activity.

(c) Federal

The Federal Government has jurisdiction over all vehicles manufactured and sold in Canada and also responsible for railway operations in Canada. Legislation, including some noise aspects, for these sources is contained in the Motor Vehicle Safety Act and the Canada Railway Act.

3. Administration of Noise Control

The City of Hamilton has taken steps to initiate a sophisticated approach to noise control. The study completed in 1973 presented an insight into the ambient noise levels that are encountered throughout the City. A municipal noise control By-Law has been drafted and a Noise Control Officer has been appointed. The City of Hamilton also has a standing committee on pollution control which can bring political pressure to bear in matters of concern.

The Ministry of the Environment is encouraging the municipalities to adapt its model noise By-Law to their own particular requirements and many are reacting favourably. The Province also makes its staff

available to provide training and back-up for the municipalities in their noise control efforts.

Through the adoption of the model By-Law the municipalities will help to bring about the use of uniform noise levels throughout the Province.

The Province's model By-Law contains an appended schedule which provides the technical details, in a series of publications, that can be used in the implementation of the By-Law. These range from methods of measuring sound to guidelines for noise control in land use planning. In relation to land use planning, the Noise Pollution Control Section of the Pollution Control Branch has published two volumes entitled "Acoustics Technology in Land Use Planning" - I - Analysis of Noise Impact and II - Road Traffic Noise Tables. These documents can be used for guidance in the development of official plans, zoning regulations and subdivision applications. The Ministry is encouraging the use of these references by local municipal planning staff so that consideration will be provided to noise assessment and control in the crucial planning stage.

The Noise Pollution Control Section is one of the government agencies which supports the Minister of Housing in his review of applications for all changes to official plans, to zoning regulations and subdivision applications. The Section assesses these proposals for potential noise problems from roads, railways, aircraft and industries.

The Ministry of Transportation and Communications is also concerned with noise problems in the provision of highway facilities. This Ministry has an environmental group to evaluate noise from new roads and also make recommendations to the municipalities to help avoid noise problems by appropriate land use adjacent to highways. It also is carrying out measures to ameliorate noise effects on existing roadways.

The Federal Government becomes involved in noise within Hamilton-Wentworth through its jurisdiction in the area of permissible vehicular noise from new vehicles, as covered under the present Motor Vehicle Safety Act. The Federal Ministry of Transport is also responsible for noise control of railway operations. This jurisdiction is obtained through the Canada Railway Act. By contrast neither the provincial Ministry of the Environment nor the municipalities have any jurisdiction over railways in noise control matters. Any locally originating requests to control railway noise would have to be made to the Ministry of Transport at the federal level and to the Federal Department of the Environment.

Similar jurisdictional problems are encountered with regulations pertaining to federal facilities such as airports and noise from aircraft. The regional offices of the federal Department of the Environment has the responsibility for noise control on federal projects within their jurisdiction. On large new federal undertakings, be they federal projects or federally funded projects, the Federal Government makes its intentions known through announcements in the Canada Gazette and through public hearings. Briefs are requested and the public are thus provided an opportunity to express themselves on the problems of noise which they foresee as a consequence of a proposed project.

4. Implications for Hamilton-Wentworth

With the enactment of the model By-Law, or a modified version of it, the municipalities will be able to undertake programmes for local noise control. Not all of the municipalities will be able to organize a full scale assessment and policing program but a coordinated effort between the larger and smaller municipalities, with Provincial Support, should achieve an improved level of noise abatement.

To avoid future conflicts in new development, it would be desirable for the Area Municipalities to incorporate noise abatement technology in their planning processes. This would help to prevent noise-

related contradictions in adjacent land uses and minimize potential for noise problems.

There are, of course, certain noise related problems that are beyond the jurisdiction of the municipalities. Vehicle, railway and aircraft noise are regulated by Federal law and the municipalities can only advise the Federal Departments of Transport and Environment of their complaints in regard to these sources.

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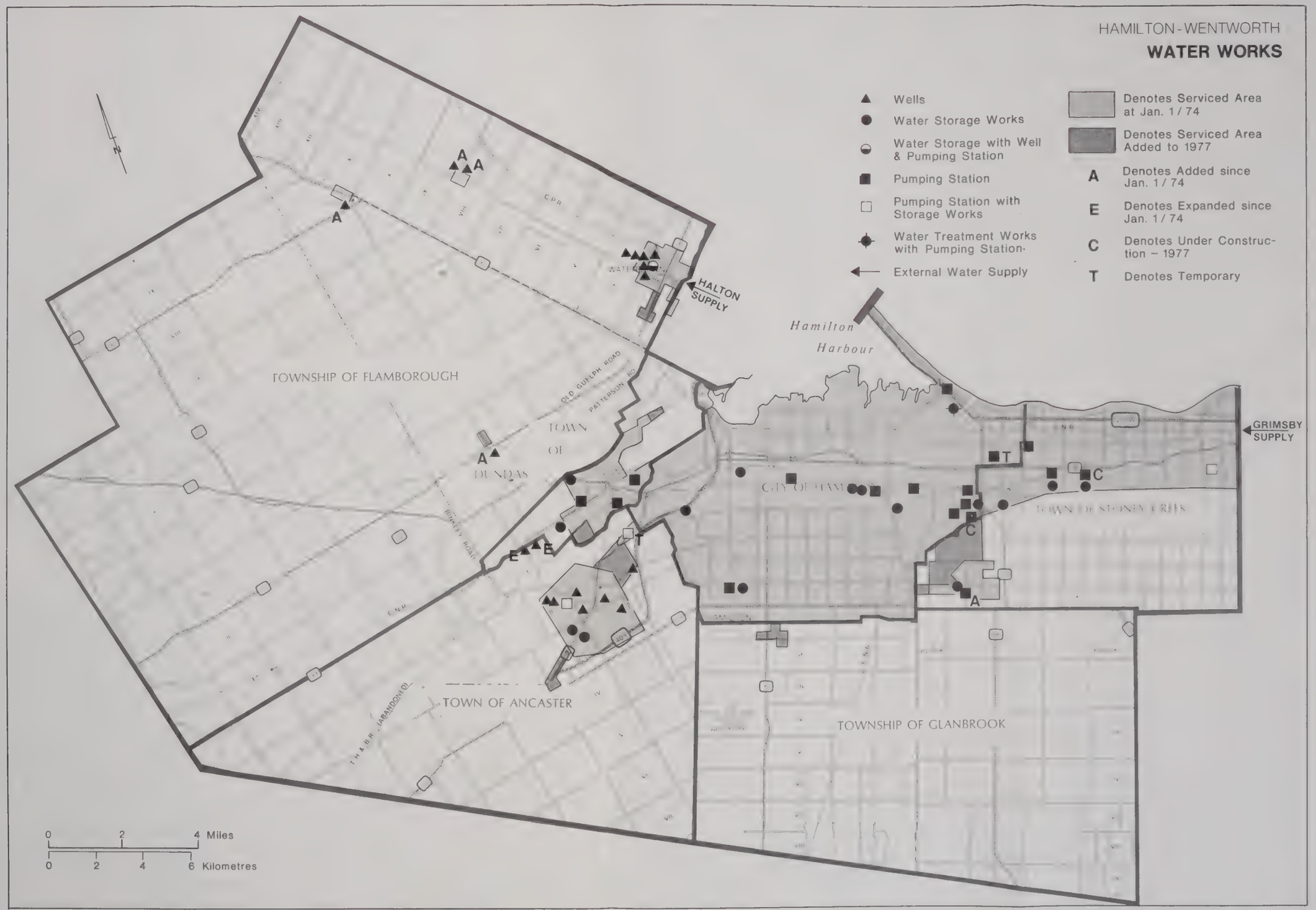

HAMILTON-WENTWORTH
WATER WORKS
Wells
Water Storage Works
Water Storage with Well & Pumping Station
Pumping Station
Pumping Station with Storage Works
Water Treatment Works with Pumping Station
External Water Supply
Denotes Serviced Area at Jan. 1/74
Denotes Serviced Area Added to 1977
A Denotes Added since Jan. 1/74
E Denotes Expanded since Jan. 1/74
C Denotes Under Construction – 1977
T Denotes Temporary
HALTON SUPPLY
GRIMSBY SUPPLY
Hamilton Harbour
TOWNSHIP OF FLAMBOROUGH
TOWN OF DUNDAS
TOWN OF ANCASTER
TOWNSHIP OF GLANBROOK
CITY OF HAMILTON
TOWN OF STONEY CREEK
OLD GUELPH ROAD
PATTERSON RD
BINBROOK ROAD
CPR
CNR
0 2 4 Miles
0 2 4 6 Kilometres

Figure 2

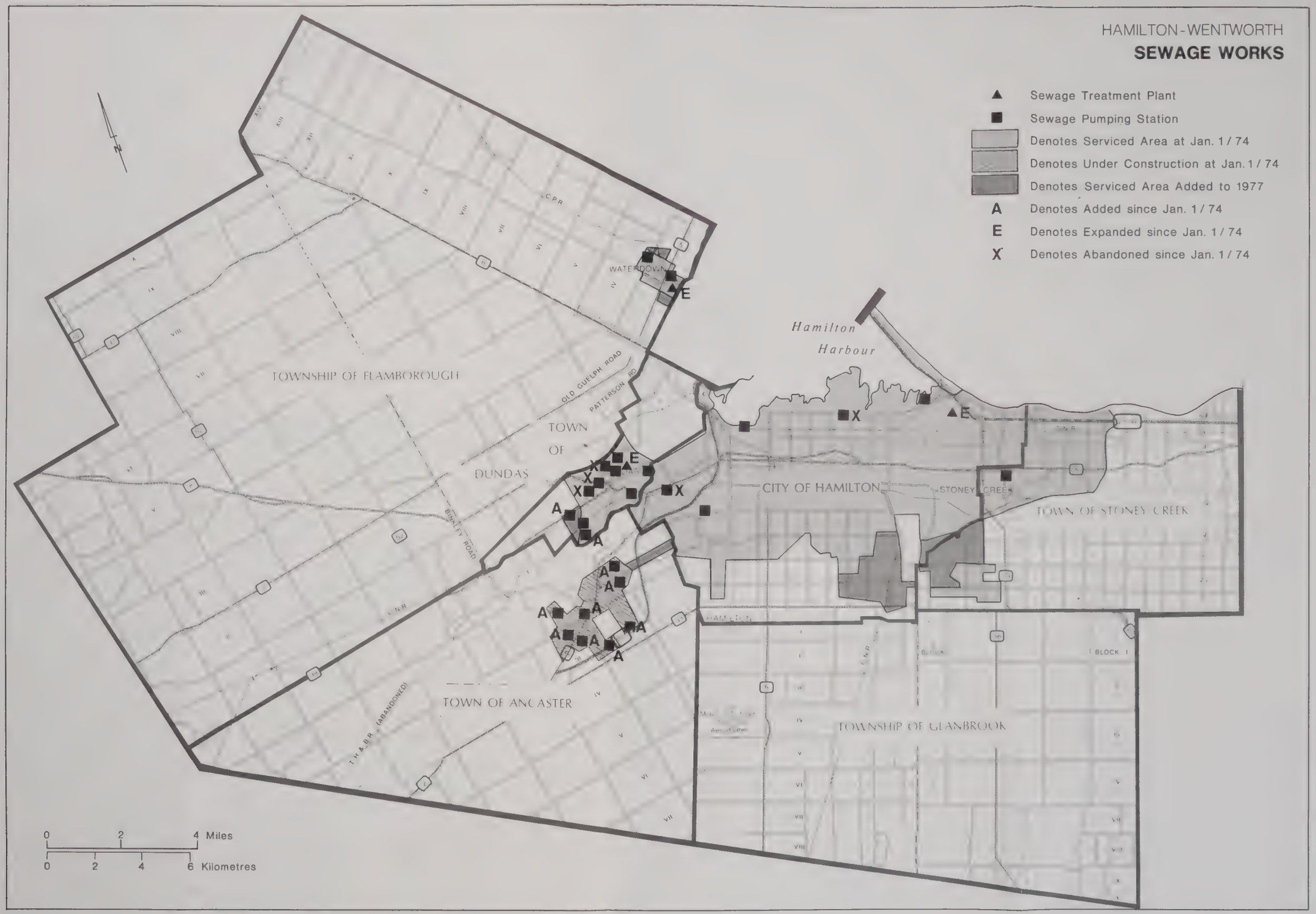
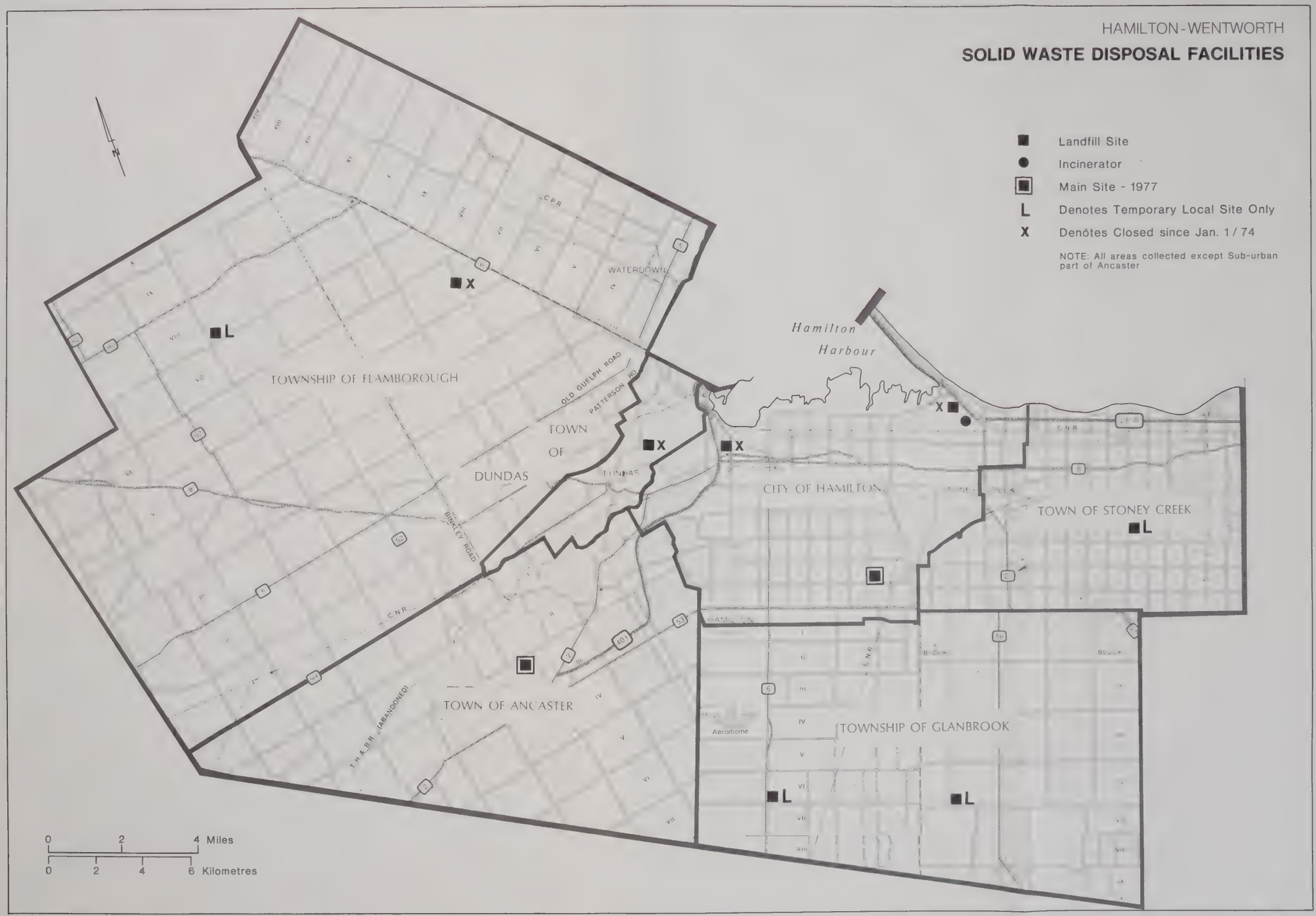

HAMILTON-WENTWORTH
SEWAGE WORKS
Sewage Treatment Plant
Sewage Pumping Station
Denotes Serviced Area at Jan. 1/74
Denotes Under Construction at Jan. 1/74
Denotes Serviced Area Added to 1977
A Denotes Added since Jan. 1/74
E Denotes Expanded since Jan. 1/74
X Denotes Abandoned since Jan. 1/74
Hamilton Harbour
TOWNSHIP OF FLAMBOROUGH
TOWN OF DUNDAS
CITY OF HAMILTON
STONEY CREEK
TOWN OF STONEY CREEK
TOWN OF ANCASTER
TOWNSHIP OF GLANBROOK
OLD GUELPH ROAD
PATTERSON RD.
BINKLEY ROAD
C.P.R.
C.N.R.
T.H.&B.R. (ABANDONED)
BLOCK I
0 2 4 Miles
0 2 4 6 Kilometres

Figure 3


HAMILTON-WENTWORTH
SOLID WASTE DISPOSAL FACILITIES
Landfill Site
Incinerator
Main Site - 1977
L Denotes Temporary Local Site Only
X Denótes Closed since Jan. 1 / 74
NOTE: All areas collected except Sub-urban part of Ancaster
TOWNSHIP OF FLAMBOROUGH
WATERDOWN
OLD GUELPH ROAD
PATTERSON RD
TOWN OF DUNDAS
BINKLEY ROAD
Hamilton Harbour
CITY OF HAMILTON
TOWN OF STONEY CREEK
TOWN OF ANCASTER
TOWNSHIP OF GLANBROOK
Aerodrome
C.N.R.
C.P.R.
T.H.&B.R. (ABANDONED)
0 2 4 Miles
0 2 4 6 Kilometres

LOCATION OF AIR SAMPLING STATIONS

Figure 4

RESEARCH REPORT ON A

REVIEW OF PHYSICAL SERVICES - PHASE II

FOR THE
HAMILTON-WENTWORTH
REVIEW COMMISSION

JAMES F. MacLAREN LIMITED

RESEARCH REPORT ON A

REVIEW OF PHYSICAL SERVICES - PHASE II

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CONSULTING ENGINEERS, PLANNERS AND SCIENTISTS

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RESEARCH REPORT ON A REVIEW OF PHYSICAL SERVICES - PHASE II FOR THE HAMILTON-WENTWORTH REVIEW COMMISSION

1. Introduction

This is the Phase II portion of the two-part research study on physical services in the Regional Municipality of Hamilton-Wentworth. The first Phase considered the present status of physical services and the changes that have occurred since the inception of Regional Government in 1974. These studies determined that the provision of physical services under the present system of Regional Government seems generally satisfactory to those who were interviewed, that is, those at the administrative level who are charged with the responsibility of the day-to-day operation of the system. Although it was not possible to make a detailed evaluation of the costs of services in every case, it appears that the costs to the taxpayer/user of the various services are not excessive. There is little evidence of duplication of staff at the Regional and Area levels.

This second phase deals with an analysis of the information collected under Phase I and will consider the impact on physical servicing of a number of options for municipal government in the Hamilton-Wentworth area that have been identified by the Commission.

2. General Considerations

Ignoring all other considerations, the optimum arrangement for physical servicing is a continuous, integrated system over the whole urban area. This will be one which is not complicated by split responsibilities which can confuse and complicate the prime purpose of the services function: to provide the necessary services in the most economical and efficient manner. This would require that one authority assume responsibility for the planning,

administration, financing, design, construction, operation and maintenance of the entire system. This would permit the following benefits:

- Policies can be established and implemented on a comprehensive and consistent basis over the whole area.

- Financing can be spread over a large base making it possible to carry out projects on a scale not feasible for smaller segregated systems.

- It is possible to support a competent staff to perform the management, technical and operational functions.

- Economies of scale can be achieved through best use of funds and personnel.

- Rate setting can be optimized as the large and small customers over the whole area will support the overall costs.

- Long range planning can be facilitated including the ability to better implement pollution control policies.

The ideal system described above is, of course, subject to potential weakness, namely that the size of the organization might be too large to be responsive to the local citizen and might seem remote and unapproachable. These criticisms can, however, be overcome with proper management approaches.

3. Engineering Considerations

The design considerations of the various physical services are important in relation to a selection of the form of local government. The following factors and constraints must be taken into consideration before a system can be designed to suit the local situation.

Water Supply and Treatment

The water suppply system design is dependent on a number of factors including topography, population distribution, water usage, capital and operating costs and metering requirements. The pressure district arrangement for a supply system is dependent on topography, water demand and delivery pressures and does not correspond to political boundaries. Therefore, the metering arrangements required by a multi-municipal government situation can become quite complex. Population density affects the costs of the water distribution system resulting in higher costs for lower density, widespread population distribution. The selection of water source is a key factor in system design. Often a single source of high quality and unlimited quantity can be used to service a large area. If many individual municipal sources are required, this can add to the cost and difficulty of obtaining adequate sources of supply. A "land-locked" municipality that does not have access to adequate water supply can be blocked from development because it does not have the funds to acquire the necessary water source.

Sewerage and Sewage Treatment

The design of the sewerage system is also dependent on topography and population densities. It can also, however, create the situation where the sewerage system crosses several municipal boundaries, thus creating the problem of apportioning capital costs for the system. Access to an adequate receiving water body for disposal of the treatment plant effluent is vital if a municipality wishes to have unrestricted growth. An area-wide or regional approach may be necessary to permit this to take place. This approach can also permit the consolidation of treatment in fewer plants and development of logical water quality objectives.

Solid Waste Management

The proper disposal of solid wastes is a major factor in a total pollution control program. Thus the disposal facilities must be

designed in such a way that further pollution will not be created - either air, water or soil. It is necessary to locate such facilities in areas that are suitable because of topography, soils type, micro-climate, etc. This can only be done if unrestricted access is available to any location over a broad geographic area.

Collection costs for solid waste are highly dependent on haul distances, particularly those of the local pickup vehicle. These costs can be minimized if transfer stations are sited conveniently to permit haulage in lower cost transfer vehicles to remote disposal facilities. This, again, requires the freedom to locate the transfer station on a district basis rather than within a specific municipal boundary.

Stormwater Management

Watersheds do not adhere to political boundaries. Therefore, inter-municipal disputes can occur over flooding, pollution, erosion, siltation, etc. that might take place in a particular stream. Some form of regional authority is required to coordinate the adequacy of stormwater management approaches and establish design criteria so that solutions can be found to these disputes.

Air Quality Control

The quality of the air we breathe has an even more direct effect on the health of the citizen than the quality of the water in streams and the soil in the ground. The control of air quality must be approached on a very broad area because of the interactions of the air emissions and the meteorological conditions that transmit these emissions. Indeed, proper control requires that the provincial and federal governments both act to protect the health and well-being of their inhabitants.

Noise Abatement

Noise can originate from local sources such as stationary machinery, loud speakers, air conditioners, lawn mowers, etc. or from mobile sources including motor vehicles, aircraft and railways. Control of these nuisances requires the combined efforts of local, provincial and federal authorities for the development of uniform and adequate legislation and noise control programs. A highly cooperative effort is needed for a comprehensive solution to this problem.

4. Options for Local Governmemt in Hamilton-Wentworth

The Commission has identified six options for municipal government in Hamilton-Wentworth, as follows:

(1) A return to the former system with a City of Hamilton, a County of Wentworth and the local municipalities.

(2) A complete single-tier municipality of Hamilton-Wentworth so that the lower-tier municipalities are abolished.

(3) Six single-tier municipalities with equal authority so that the upper-tier is abolished.

(4) An enlarged City of Hamilton to include that area which is presently urbanized or will be in the not too distant future; local municipalities in the rest of the Region might be formed into a new county system or annexed to adjacent counties and Regions.

(5) As (4), i.e. an enlarged City of Hamilton, but with the rest of the Region organized into a rural single-tier municipality.

(6) Continuation of the present two-tier regional government system with any appropriate modifications in function and in number and size of the various constituent municipalities which would lead to an improved local government system.

Each of these alternatives has been reviewed in the light of the Phase I studies and the foregoing discussions in this report. Accordingly, the following conclusions have been drawn with regard to the potential impact on physical services of the six alternatives.

(1) Return to the Former System

It is considered that it would be a retrograde step to return to the former system of local government. This would mean that the water and sewage services would again be fragmented and the inevitable duplications and inefficiencies would be reintroduced. Notwithstanding this fragmentation, the Hamilton water and sewage systems would still form the nucleus of a regional type service, and many of the local municipalities would be dependent on the City for these vital services but without a voice in their planning and management. The water systems would again have to be isolated along municipal boundaries and meters installed to measure the water consumed by each participant.

Solid waste management would again be divided among all municipalities and each would have to face the difficulty and expense of providing its own disposal facility unless some form of co-operative arrangement were established.

The effect upon storm drainage would be nominal with the exception that the City of Hamilton would again assume control of its combined sewerage system.

Air quality control and noise abatement would be affected very little as these functions are controlled by the Province and the local municipalities respectively.

In general, the many advantages of common planning, centralized engineering, multiple use of adjacent facilities, equalized assessment, uniform maintenance and rate-setting, etc. would be lost.

(2) Single-Tier System

This would be highly advantageous from the standpoint of engineering, financial and operating considerations. As described earlier, the numerous advantages of a unified, comprehensive approach to physical servicing would be available to the single-tier municipality. The many other considerations that have to be weighed in relation to services of all other types might not indicate the same conclusion. If a single-tier arrangement were adopted, some form of district office arrangement would be necessary not only to permit a decentralization of some of the operating and maintenance functions, but also to provide a communications link with the local citizens.

(3) Six Single-Tier Municipalities

This arrangement would lead to many of the same problems that are described under number (1). Six separate municipalities operating independently would be inefficient and would prevent the long-range development opportunities and cost sharing benefits of the larger scale municipal arrangements. Some form of cooperative development of physical servicing between municipalities would be necessary to overcome these problems. The alternative solution would be intervention by the Province for the provision of regional water, sewage and solid waste management systems.

(4) An Enlarged City of Hamilton With a New County Arrangement in the Balance of the Region

If the enlarged City were designated as the long term urban area and the balance confined to a non-urban destiny, the impact on physical services would be a positive one because this would permit an essentially single-tier arrangement within the City. This would permit the continuous development of the integrated water supply and sewage systems without the

complications of political boundaries which can create jurisdictional and operational disputes as well as cost inefficiencies. There might still be some conflict, however, because of the necessity of the urban government to obtain solid waste disposal sites in the rural area. Sufficient space for future development of the City would have to be provided at the time of reorganization. Isolated settlements in the rural area would then not be permitted to grow in a significant way.

(5) An Enlarged City of Hamilton but With the Remainder Organized as a Single Tier Municipality

As noted in (4) previously, the servicing of the enlarged City of Hamilton would be facilitated by the consolidation of all services under a single authority. If the enlarged city were surrounded by a second single-tier municipality, complications could arise. The single tier municipality would have access to Lake Ontario in the present Town of Stoney Creek and could, therefore, logically develop its own physical services in the areas east and south of the enlarged City. Interactions between the two might occur in relation to drainage programs and solid waste disposal. These could, no doubt, be resolved with cooperation. The areas to the west of the enlarged City would probably be restrained from development and would remain rural because of the inaccessability to Lake Ontario.

(6) Continuation of Present Two-Tier Regional Government With Modifications to Constituent Municipalities

This alternative would have the advantage that it is already in existence and has the experience of four years of operation. The Phase I report has outlined in some detail the findings of an investigation into the success of physical servicing under this form of local government. The study team could not determine serious problems in relation to physical services nor could they uncover evidence of unnecessary duplication or excessive cost. The adoption of this alternative

would, therefore, have minimal impact on physical services and further refinements in the system could be implemented to improve its effectiveness. The conclusions and recommendations that have been noted in the Summary Section of the Phase I Report provide suggestions for a few of these possible refinements.

5. Summary

(a) Ideally, a single-tier government will permit a comprehensive and efficient approach to the provision of physical services. Long-range policies for development and environmental protection and lowest cost servicing would be possible with this arrangement. The system should be responsive to the people, however, and some form of decentralization might be necessary.

(b) Compromises in the ideal arrangement will probably be necessary in view of competing priorities and objectives for other types of services. The physical services in a compromise arrangement must be designed on the basis of a "best fit" arrangement within the monetary budget available, and the complete array of competing priorities.

It is clear, however, that under any alternative arrangement at least the water treatment, sewage treatment and solid waste disposal facilities will continue to serve the total urban area.

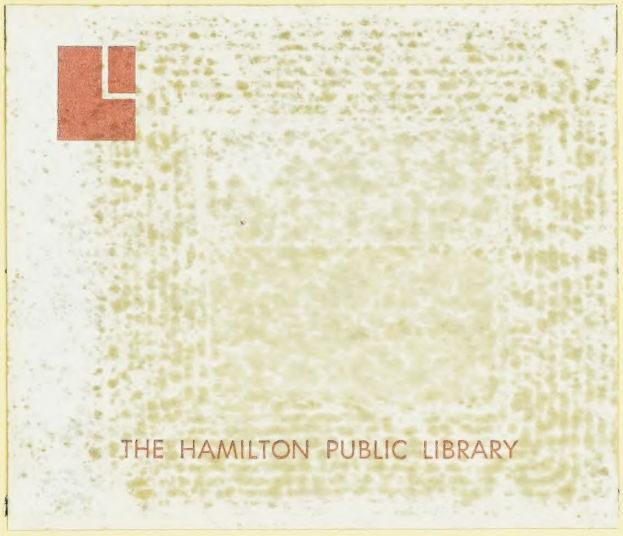
(c) The expansion of physical services is normally responsive to the decisions of planners and politicians and these decisions should take into account the engineering considerations implicit in each decision. The costs and constraints of providing physical services should be recognized in the overall approach to development.

(d) Overall policies with respect to physical services should provide for uniformity of service throughout the entire muni-

cipality. Where two-tier government creates split responsibilities for similar services such as storm water management, it is desirable to establish common criteria and approaches.

(e) The Provincial Government can provide technical assistance in relation to planning for pollution control and environmental enhancement. This could be used beneficially by local government of whatever type, particularly in relation to air quality control and noise abatement but also for water quality planning and environmental protection.

(f) Because the present two-tier form of local government appears to be working reasonably well in relation to physical servicing, it is recommended that this form of government be continued. Improvements should be implemented where required to improve citizen communications, simplify the application process, reduce the complexity and cost of obtaining solid waste disposal sites, establish uniform storm water management approaches, and incorporate air quality control and noise abatement techniques in land development.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